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Huebner et al.

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(54) **COMPUTER SYSTEMS FOR REGULATING ACCESS TO ELECTRONIC CONTENT USING USAGE TELEMETRY DATA**

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(73) Assignee: **Altair Engineering, Inc.**, Troy, MI (US)

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G06F 15/16 (2006.01)
H04L 9/40 (2022.01)
(Continued)

(52) **U.S. Cl.**
CPC ***H04L 63/102*** (2013.01); ***G06F 16/2379*** (2019.01); *G06Q 10/087* (2013.01)

(58) **Field of Classification Search**
CPC .. H04L 63/102; G06F 16/2379; G06Q 10/087
See application file for complete search history.

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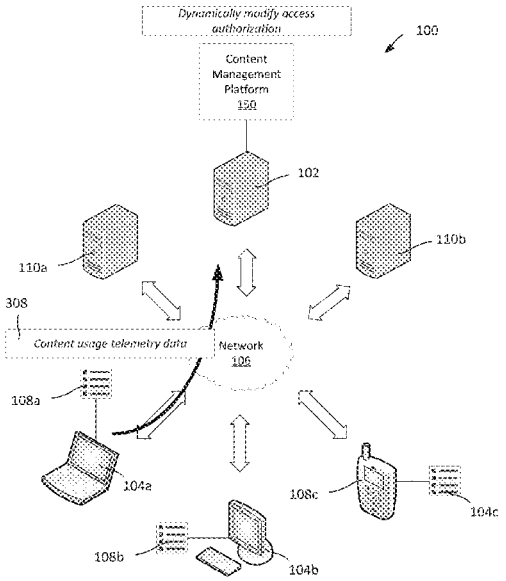
Primary Examiner — Oleg Survillo
(74) *Attorney, Agent, or Firm* — Fish & Richardson P.C.

(57) **ABSTRACT**

A method is performed to regulate access to electronic content based on content usage telemetry data. A first computer receives, from a second computer system, a request for access to electronic content. The first computer system determines, based on an access profile associated with the second computer system, that the second computer system is authorized to access the electronic content. A first authorization message indicating that the second computer system is authorized to access the electronic content is transmitted from the first computer system to the second computer system. The first computer system receives, from the second computer system, content usage telemetry data including data items indicating metrics of use of the electronic content by the second computer system. The first computer system modifies the access profile of the second computer system based on the content usage telemetry data.

17 Claims, 15 Drawing Sheets



(51) **Int. Cl.**
G06F 16/23 (2019.01)
G06Q 10/087 (2023.01)

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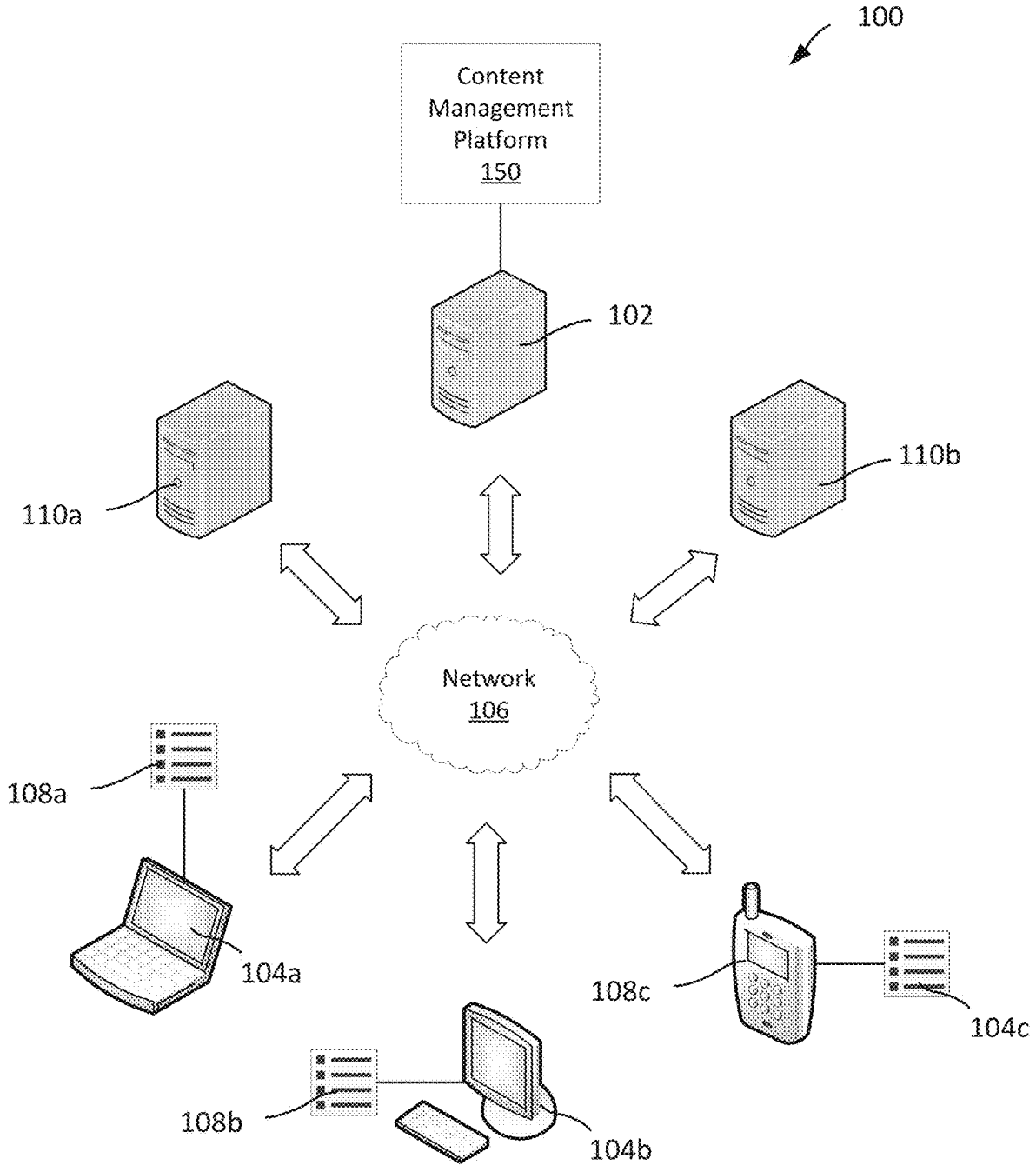

100
Content Management Platform 150
102
110a
110b
Network 106
108a
104a
108c
104c
108b
104b

FIG. 1

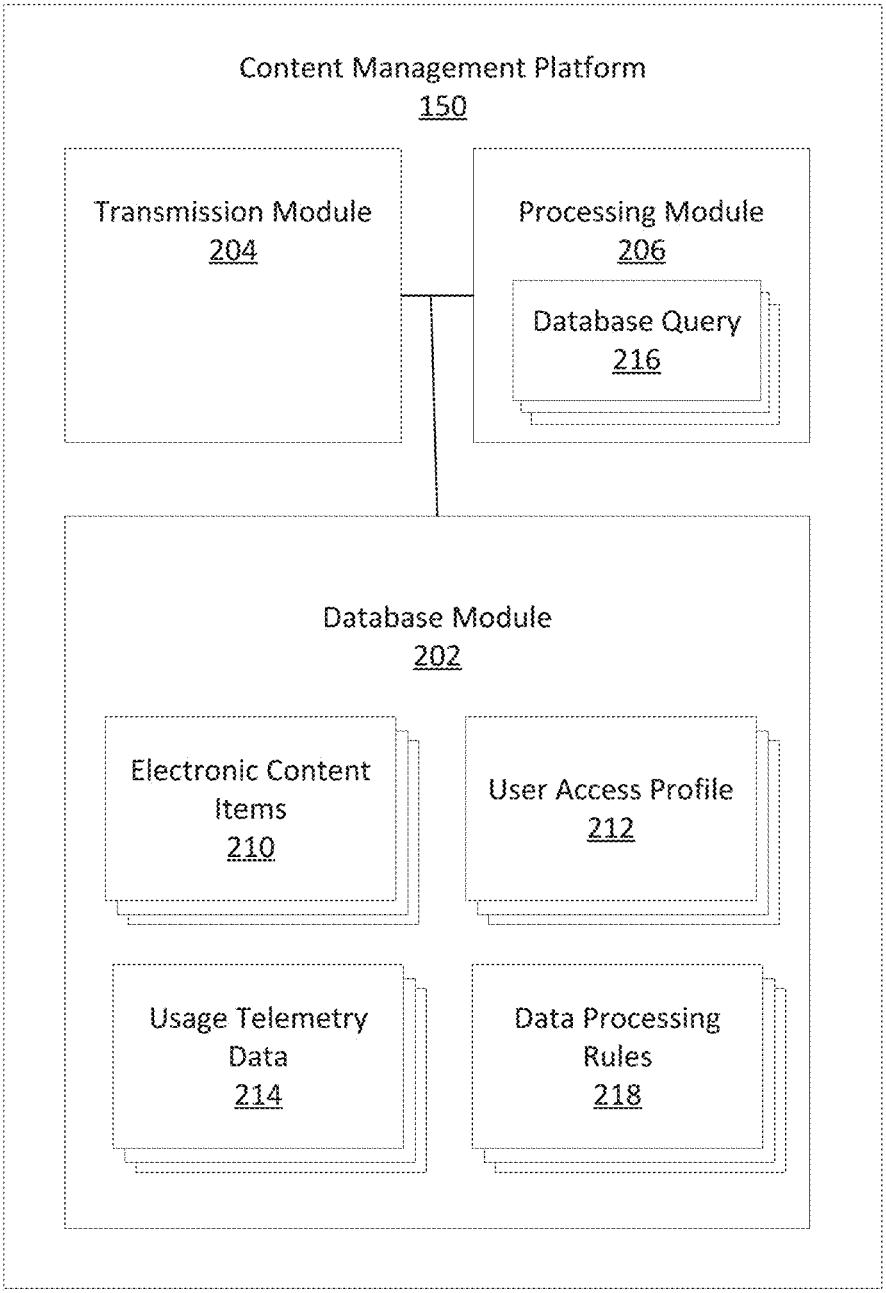

Content Management Platform
150
Transmission Module
204
Processing Module
206
Database Query
216
Database Module
202
Electronic Content Items
210
User Access Profile
212
Usage Telemetry Data
214
Data Processing Rules
218

FIG. 2

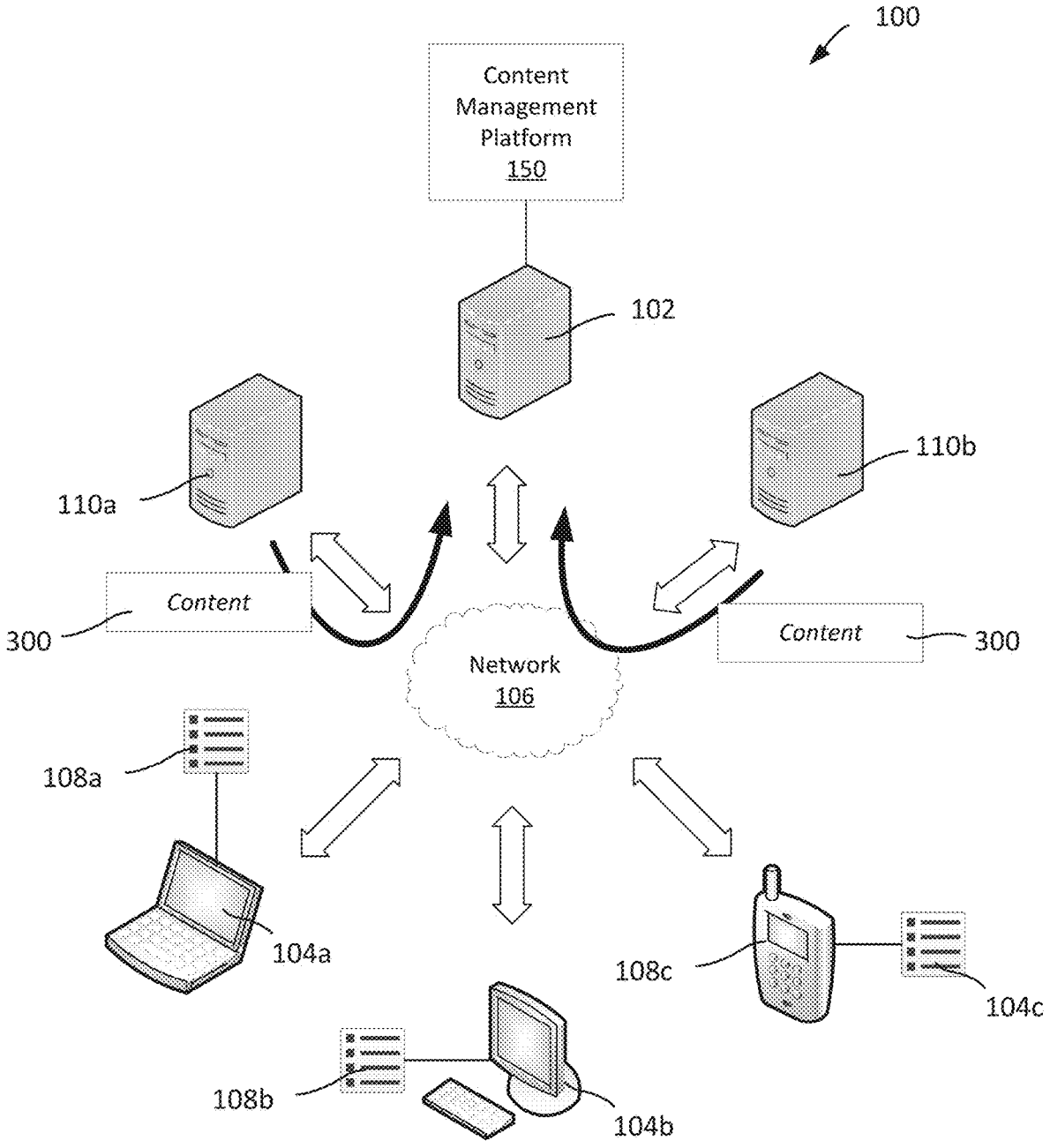

100
Content Management Platform 150
102
110a
110b
Content
300
Content
300
Network 106
108a
104a
108c
104c
108b
104b

FIG. 3A

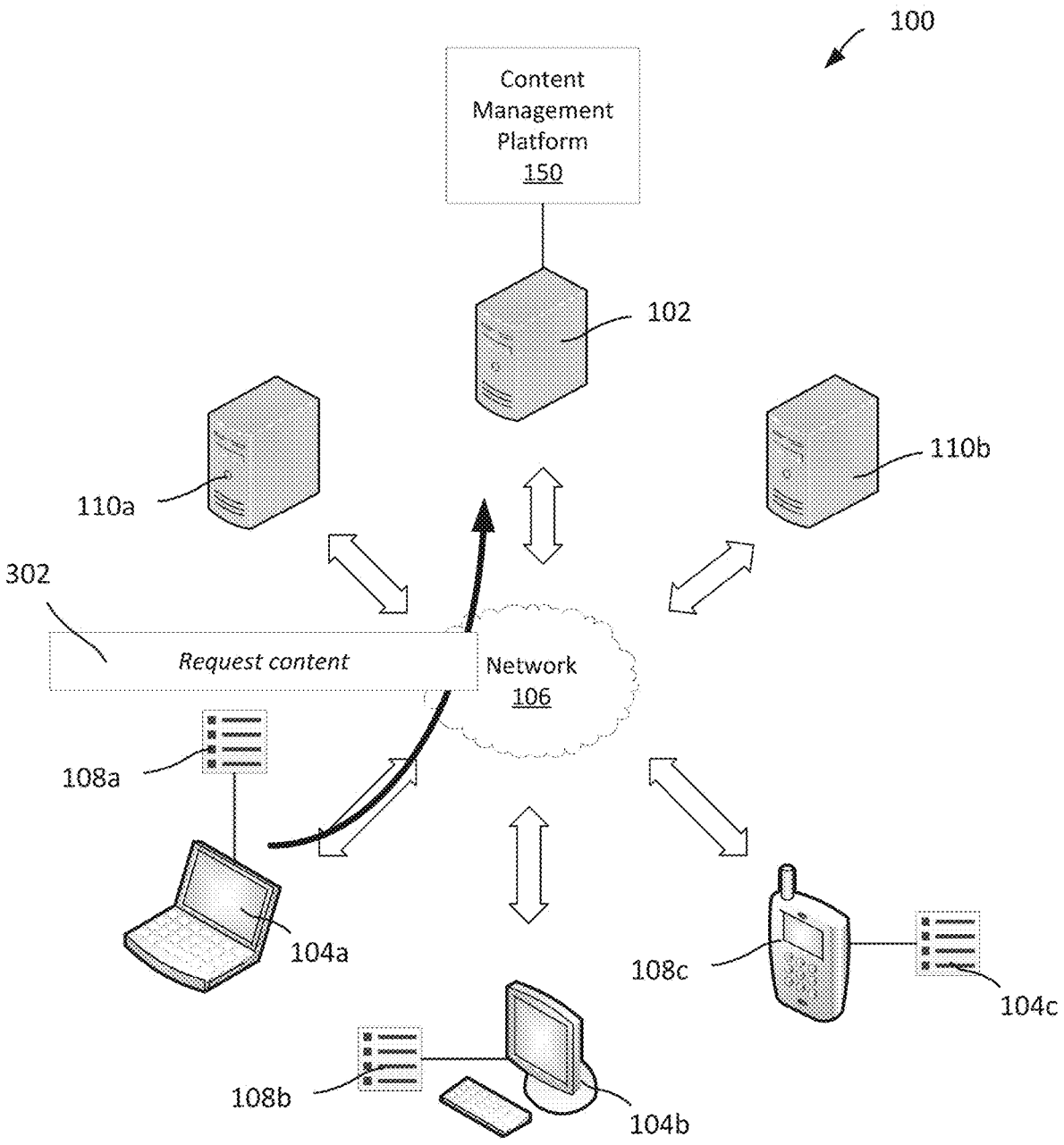

100
Content Management Platform 150
102
110a
110b
302
Request content
Network 106
108a
104a
108c
104c
108b
104b

FIG. 3B

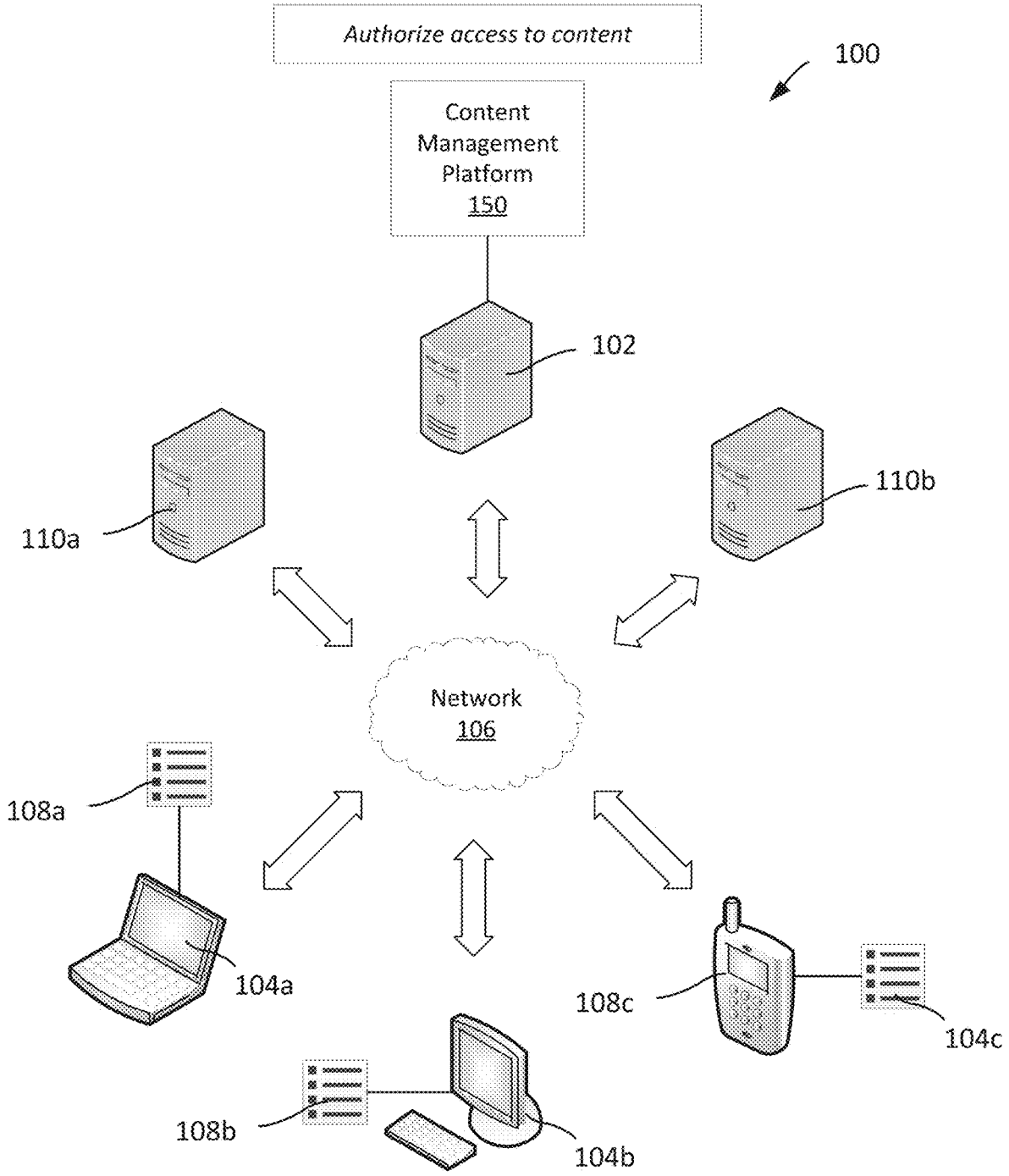
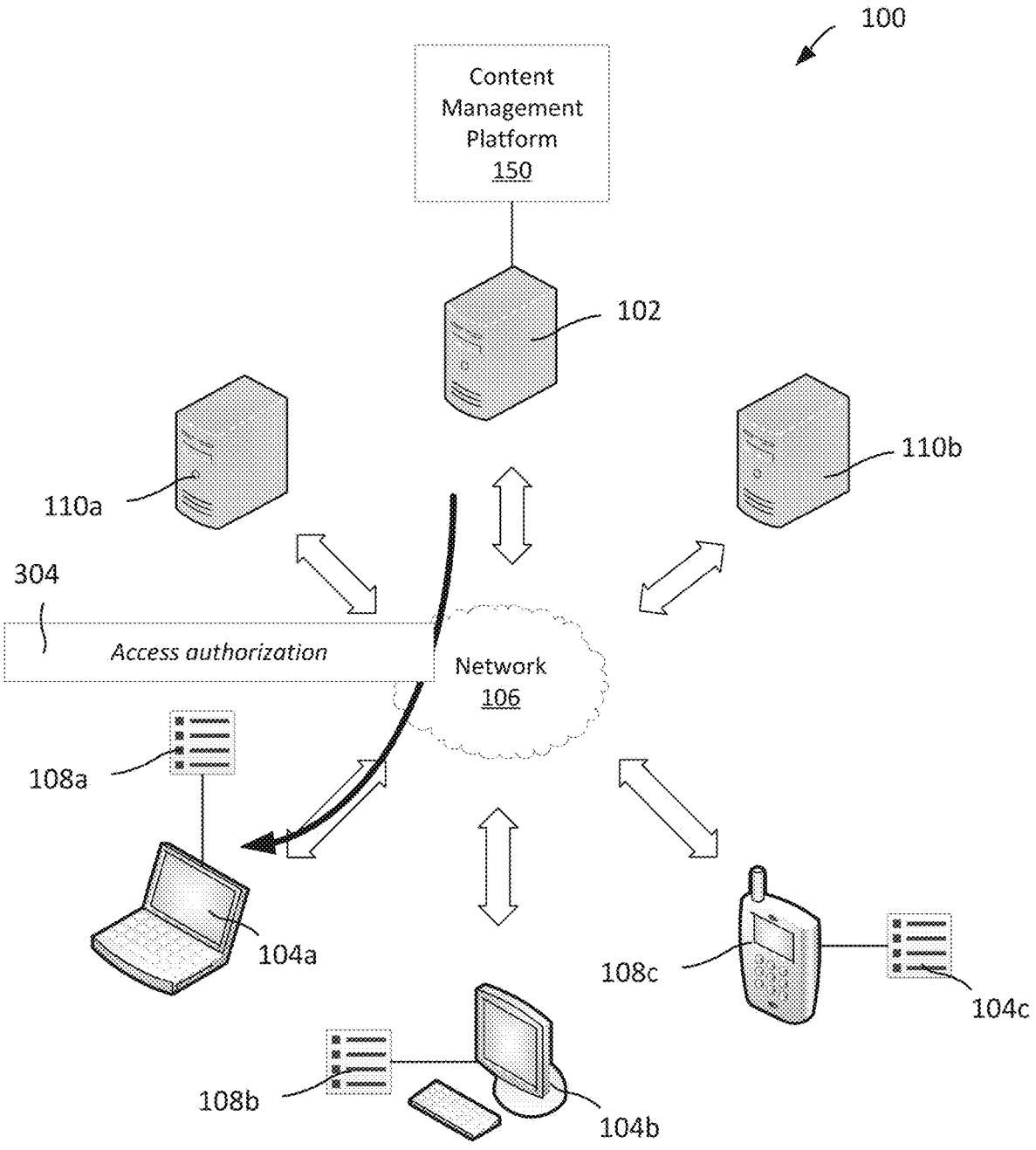

Authorize access to content
100
Content Management Platform 150
102
110a
110b
Network 106
108a
104a
108c
104c
108b
104b

FIG. 3C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Content Management Platform 150
102
110a
110b
304
Access authorization
Network 106
108a
104a
108c
104c
108b
104b

FIG. 3D

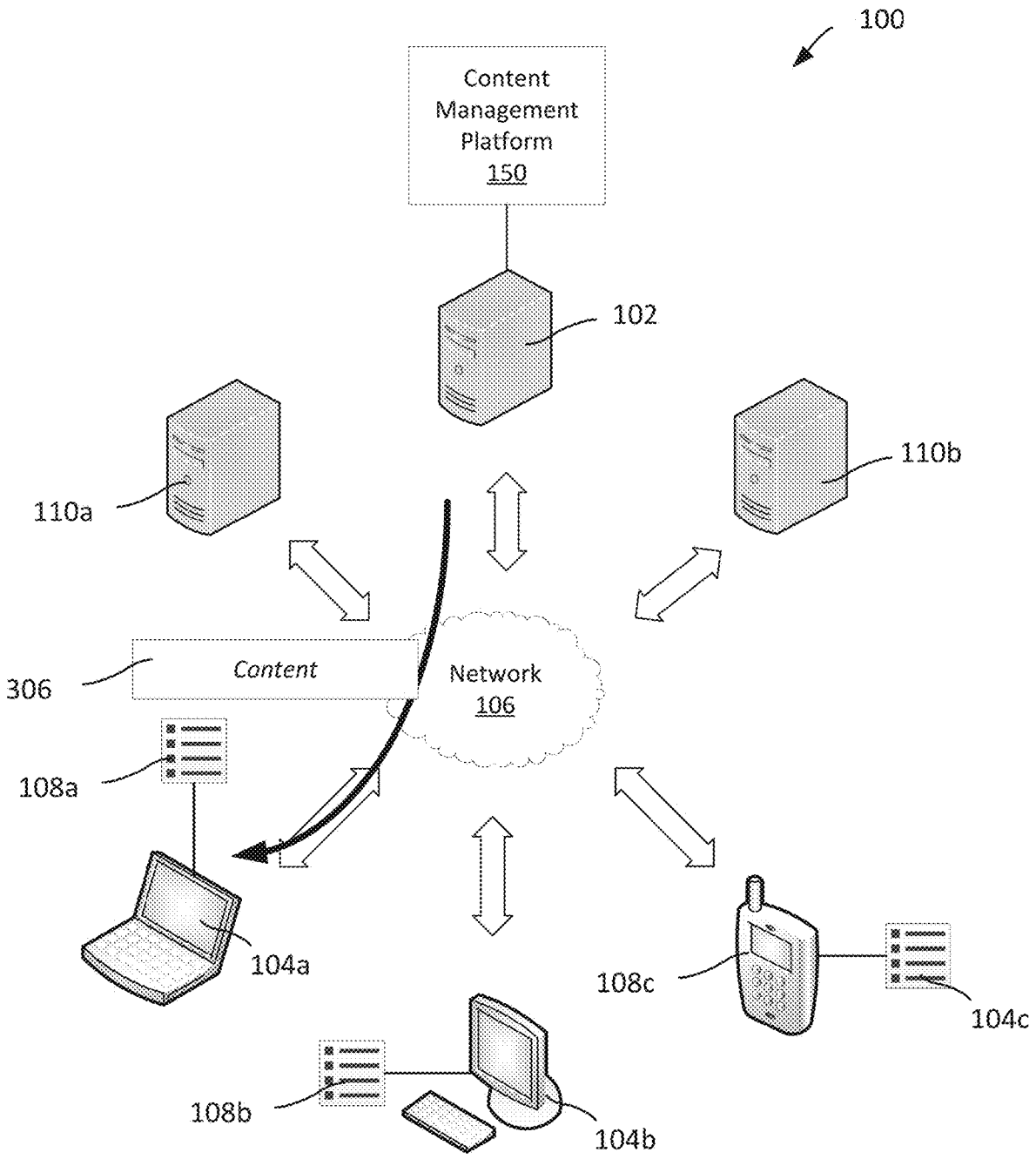
100
Content Management Platform 150
102
110a
110b
306
Content
Network 106
108a
104a
108c
104c
108b
104b

FIG. 3E

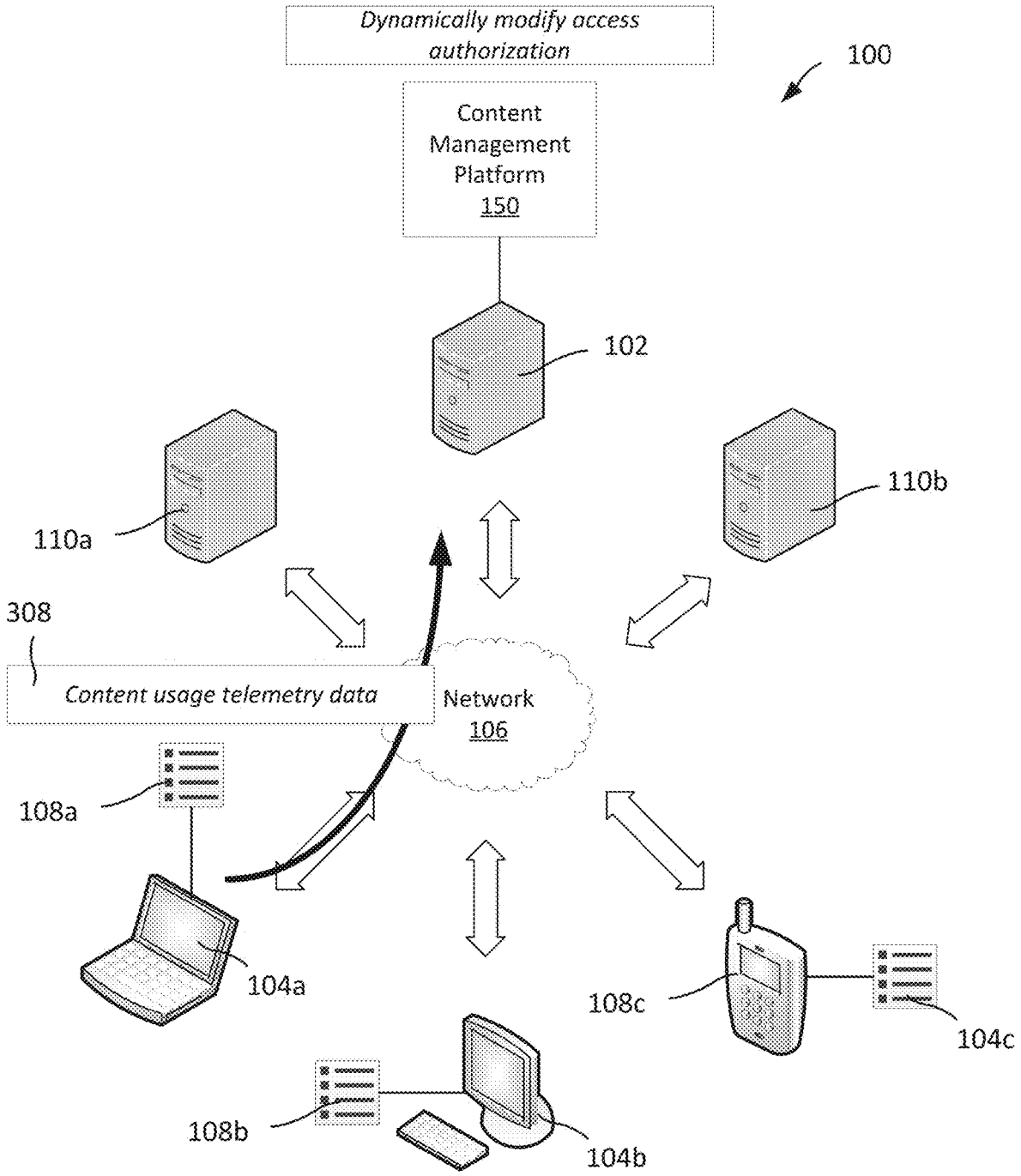
Dynamically modify access authorization
100
Content Management Platform 150
102
110a
110b
308
Content usage telemetry data
Network 106
108a
104a
108c
104c
108b
104b

FIG. 3F

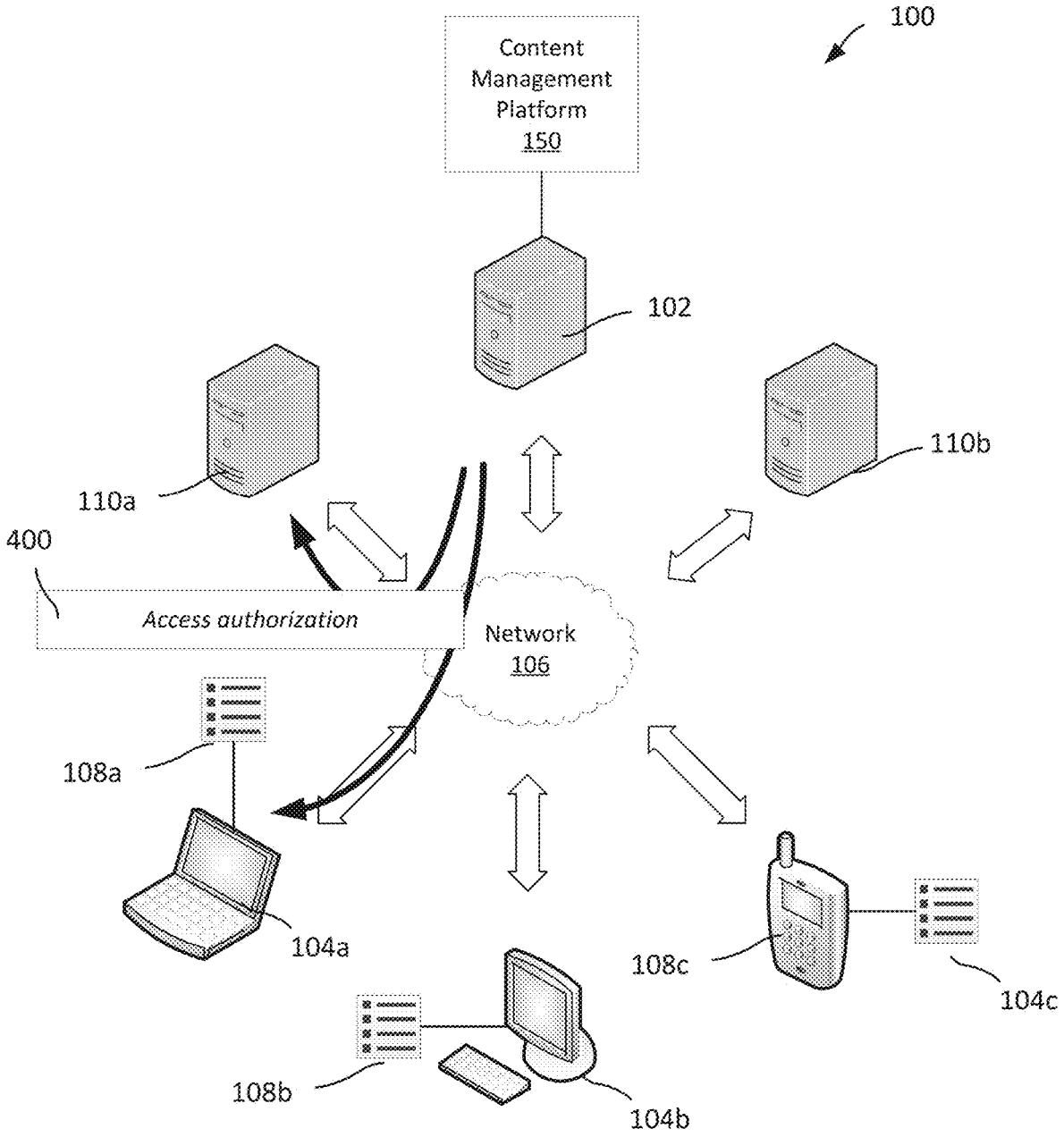
100
Content Management Platform 150
102
110a
110b
400
Access authorization
Network 106
108a
104a
108c
104c
108b
104b

FIG. 4A

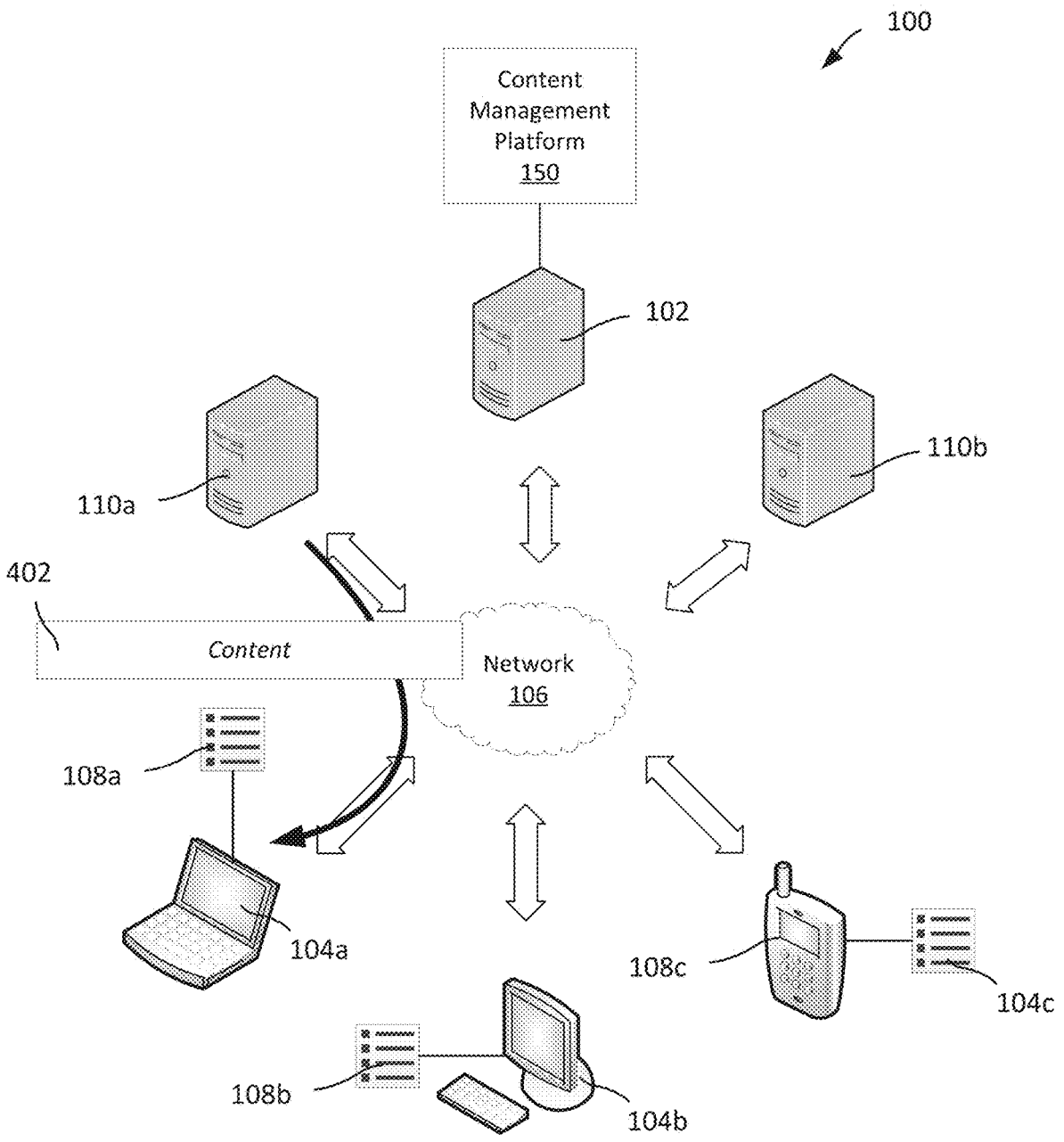
100
Content Management Platform 150
102
110a
110b
402
Content
Network 106
108a
104a
108c
104c
108b
104b

FIG. 4B

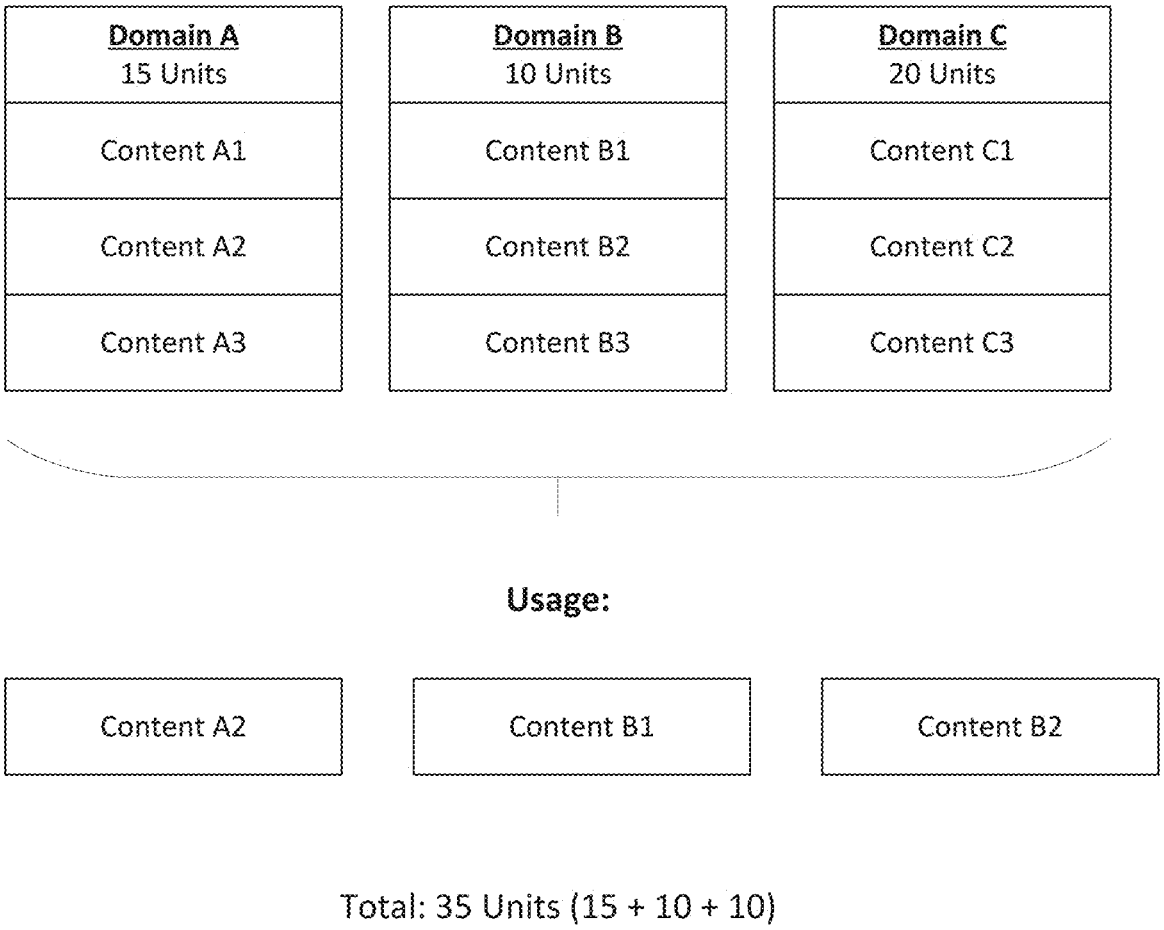
Domain A
15 Units
Content A1
Content A2
Content A3
Domain B
10 Units
Content B1
Content B2
Content B3
Domain C
20 Units
Content C1
Content C2
Content C3
Usage:
Content A2
Content B1
Content B2
Total: 35 Units (15 + 10 + 10)

FIG. 5

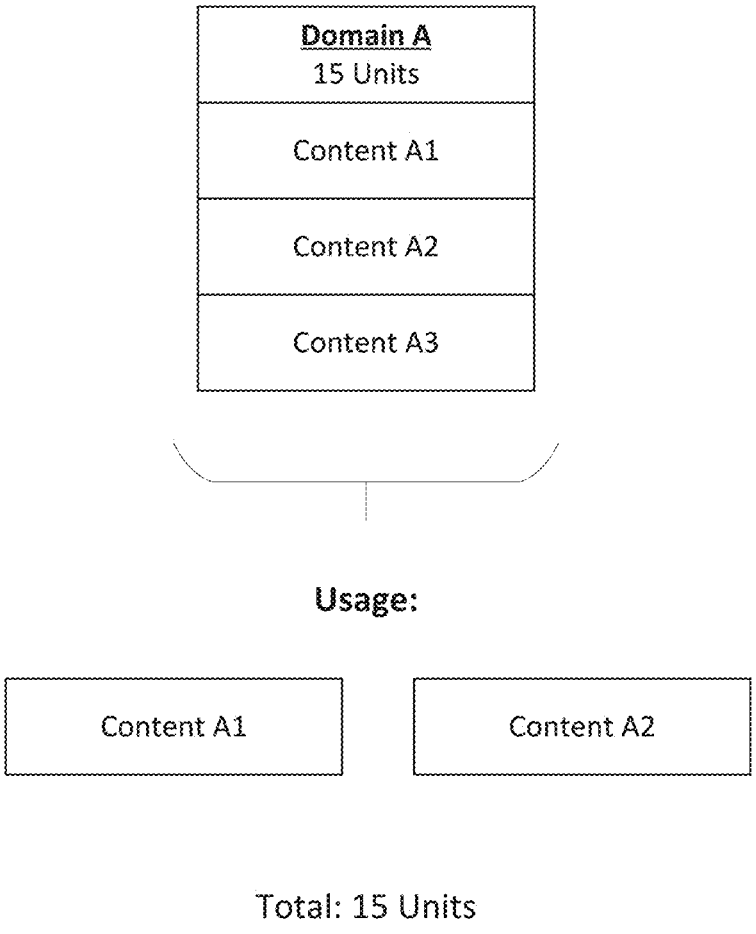
Domain A
15 Units
Content A1
Content A2
Content A3
Usage:
Content A1
Content A2
Total: 15 Units

FIG. 6

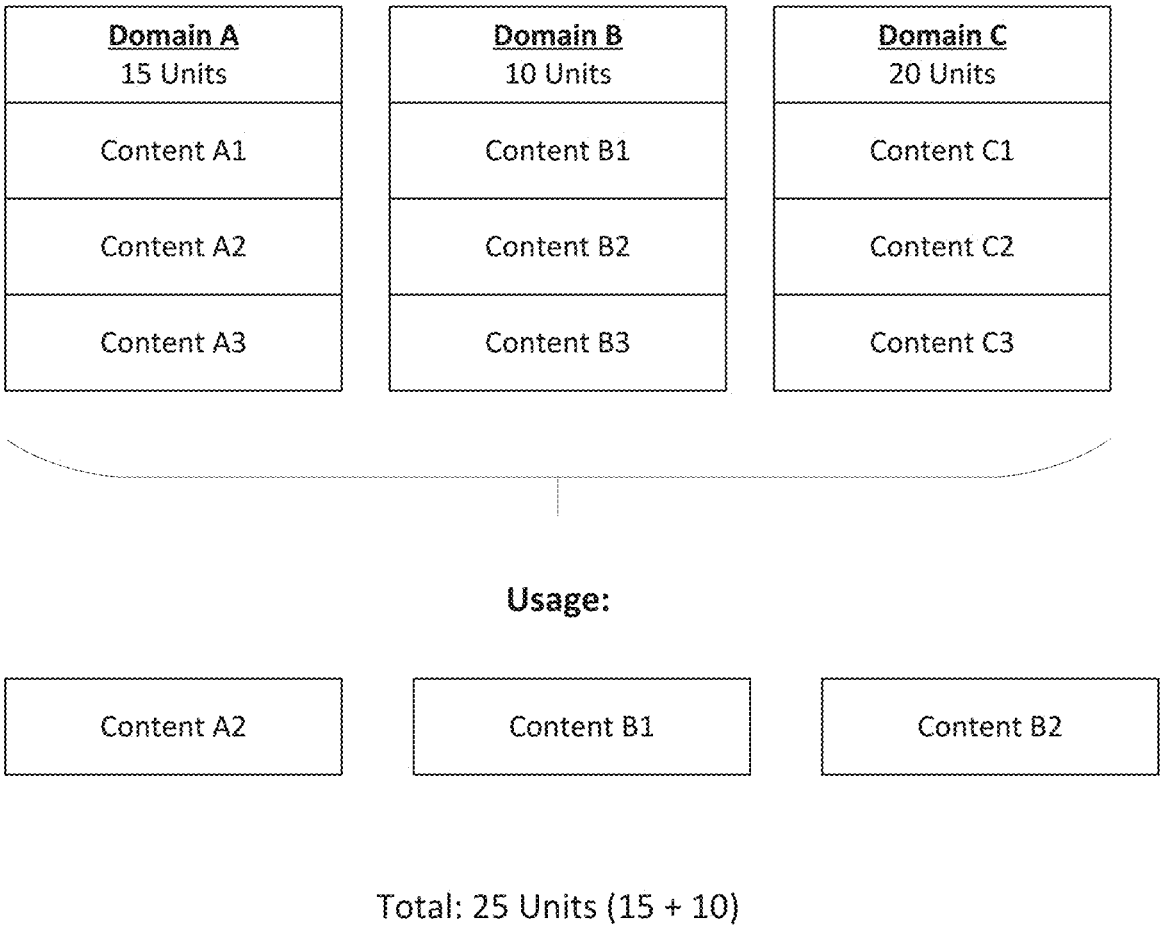
Domain A
15 Units
Content A1
Content A2
Content A3
Domain B
10 Units
Content B1
Content B2
Content B3
Domain C
20 Units
Content C1
Content C2
Content C3
Usage:
Content A2
Content B1
Content B2
Total: 25 Units (15 + 10)

FIG. 7

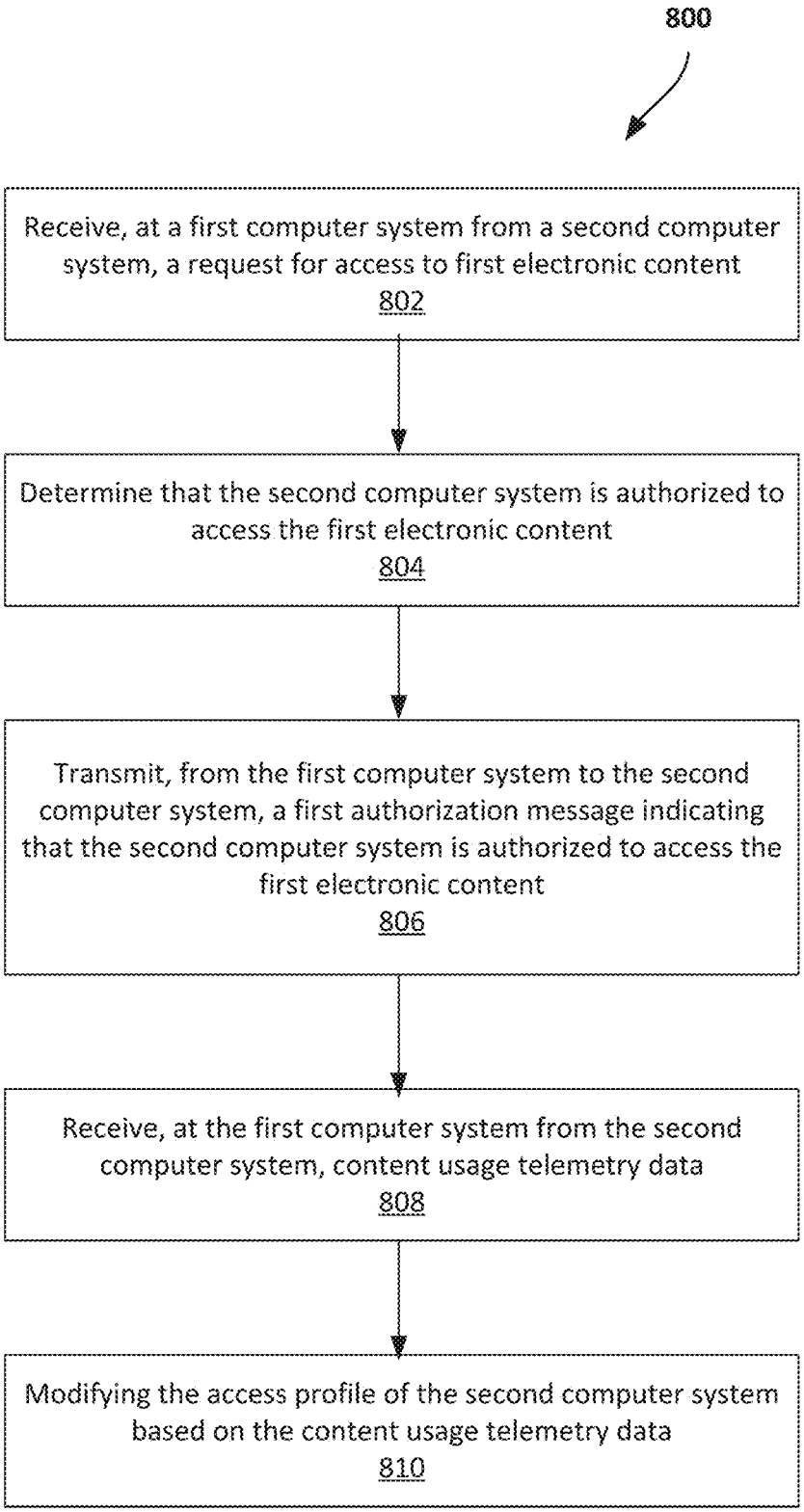
800
Receive, at a first computer system from a second computer system, a request for access to first electronic content
802
Determine that the second computer system is authorized to access the first electronic content
804
Transmit, from the first computer system to the second computer system, a first authorization message indicating that the second computer system is authorized to access the first electronic content
806
Receive, at the first computer system from the second computer system, content usage telemetry data
808
Modifying the access profile of the second computer system based on the content usage telemetry data
810

FIG. 8

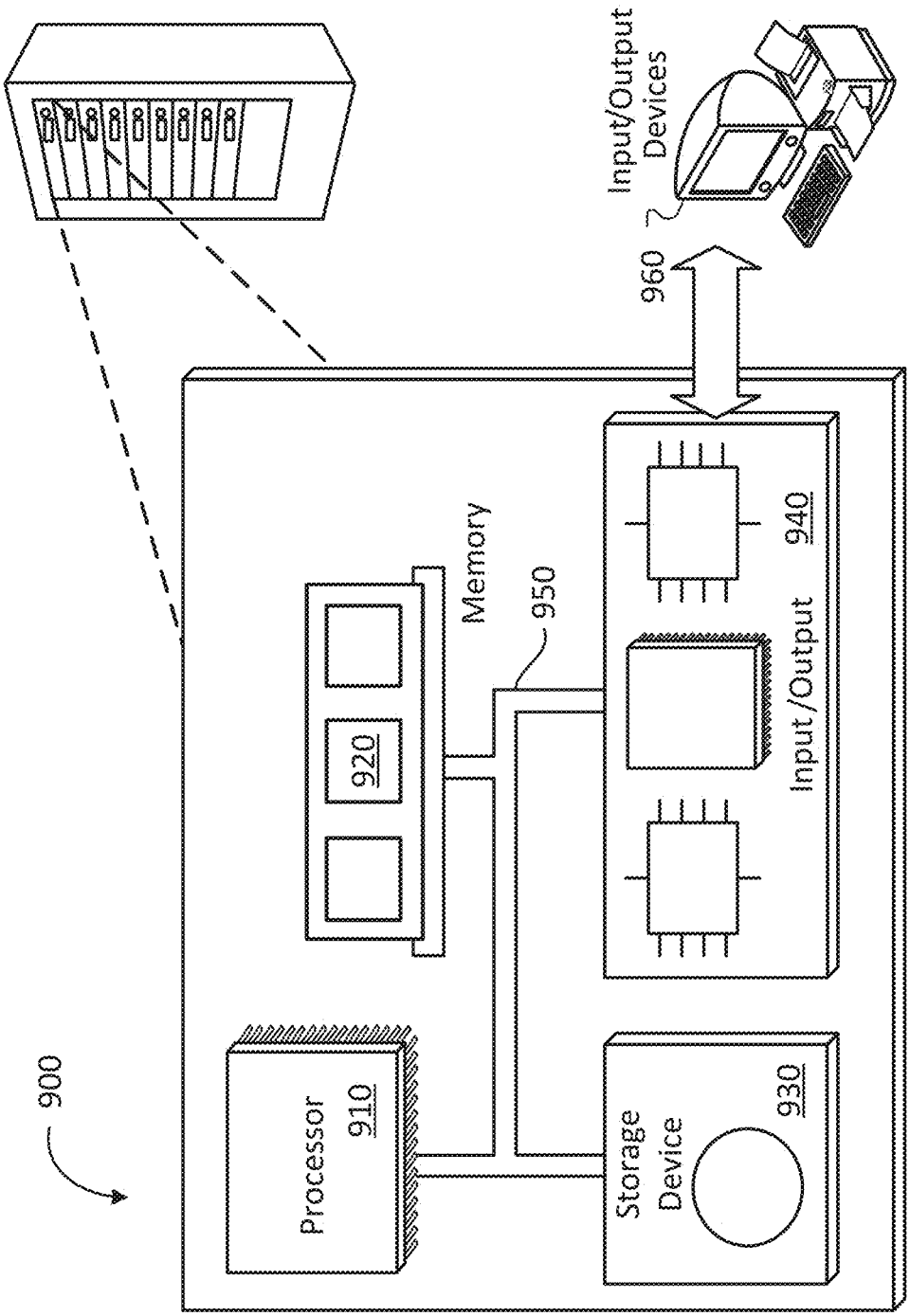
900
Processor
910
Memory
920
950
Storage
Device
930
Input/Output
940
960
Input/Output
Devices

FIG. 9

COMPUTER SYSTEMS FOR REGULATING ACCESS TO ELECTRONIC CONTENT USING USAGE TELEMETRY DATA

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority to U.S. Provisional Patent Application No. 62/802,508, filed Feb. 7, 2019, which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

This description relates to computer systems for regulating access to electronic content using usage telemetry data.

BACKGROUND

Computer systems can be used to generate and modify electronic content. As an example, computer-aided engineering (CAE) or computer-aided design (CAD) systems can be used to generate computerized models representing electrical, mechanical, and/or chemical systems, and simulate the characteristics of the systems under various conditions. In some cases, computerized models can be generated by incorporating multiple computerized sub-models. For example, a computerized model representing a vehicle can include sub-models representing certain components or sub-systems of the vehicle (e.g., the electrical sub-system, the engine, the environmental regulation sub-systems, etc.).

SUMMARY

Computer systems can be used to regulate access to electronic content using usage telemetry data. As an example, a computer system can include a content management platform that stores electronic content items, and makes the electronic content items available to one or more other computer systems (e.g., one or more client computer systems) for retrieval and use. Further, the content management platform can monitor the retrieval and use of the electronic content items by the client computer systems, and regulate access to the electronic content items based on the information. As an example, the content management platform can collect usage telemetry data describing the manner in which particular electronic content items are retrieved and used by each of the client computer systems. Further, the content management platform can dynamically regulate the access to the electronic content items based on the usage telemetry data (e.g., dynamically provide access to certain electronic content items by certain client computer systems, restrict access to certain electronic content items by certain client computer systems, and/or allocate resources to one or more entities based on usage patterns).

The implementations described herein can provide a variety of benefits. For example, the content management platform can automatically manage access to electronic contents items based on the dynamic usage characteristics of each of the client computer systems. Accordingly, the content management platform can automatically adapt the distribution of electronic content items to account for variations in the operation of each of the client computer systems, without the need for manual human intervention. Thus, electronic content items can be distributed and used more effectively and efficiently in a wide array of technical environments.

In an aspect, a method for regulating access to electronic content based on content usage telemetry data includes receiving, by a first computer system from a second computer system, a request for access to first electronic content. The second computer system is associated with an access profile. The method also includes determining, by the first computer system based on the access profile, that the second computer system is authorized to access the first electronic content. The method also includes transmitting, from the first computer system to the second computer system, a first authorization message indicating that the second computer system is authorized to access the first electronic content. The method also includes receiving, by the first computer system from the second computer system, content usage telemetry data. The content usage telemetry data includes one or more data items indicating metrics of use of the first electronic content by the second computer system. The method also includes modifying, by the first computer system, the access profile of the second computer system based on the content usage telemetry data.

Implementations of this aspect can include one or more of the following features.

In some implementations, the first electronic content can include one or more of a data object for use in a computerized model, an image, a video, audio, or textual data.

In some implementations, the content usage telemetry data can include one or more data items indicating a length of time that the electronic is in use by the second computer system.

In some implementations, the content usage telemetry data can include one or more data items indicating one or more types of usage of the first electronic content by the second computer system.

In some implementations, the content usage telemetry data can include one or more data items indicating, for each type of usage of the first electronic content by the second computer system, a length of time that the electronic is in use by the second computer system according to that type of usage.

In some implementations, the one or more types of usage can include one or more of including the first electronic content in second electronic content, presenting the first electronic content to a user, or performing one or more data processing techniques with respect to the first electronic content.

In some implementations, including the first electronic content in the second electronic content can include including the first electronic content in a computerized model.

In some implementations, presenting the first electronic content the user can include displaying at least a portion of the first electronic content to the user using a display device.

In some implementations, performing one or more data processing techniques with respect to the first electronic content can include including the first electronic content in a computerized model and simulating an operation of an apparatus using the computerized model.

In some implementations, the content usage telemetry data can be received periodically by the first computer system from the second computer system.

In some implementations, the content usage telemetry data can be received continuously by the first computer system from the second computer system.

In some implementations, the content usage telemetry data can be transmitted by the second computer system to the first computer system in response to a trigger event.

In some implementations, the trigger event can be an end of a usage session of the first electronic content.

In some implementations, the access profile can include an indication of a number of licensing units available for use by the second computer system. Determining that the second computer system is authorized to access the first electronic content can include determining that the number of licensing units available for use by the second computer system is greater than or equal to a number of licensing units associated with the first electronic content.

In some implementations, the method can further include reducing the number of licensing units available for use by the second computer system by the number of licensing units associated with the first electronic content responsive to the request.

In some implementations, modifying the access profile of the second computer system based on the content usage telemetry data can include increasing or decreasing the number of licensing units available for use by the second computer system based on the content usage telemetry data.

In some implementations, the method can further include determining an amount of funds associated with usage of the first electronic content by the second computer system based on the content usage telemetry data.

In some implementations, first electronic content is stored by the first computer system. The first computer system can transmit the first electronic content to the second computer system upon determining that the second computer system is authorized to access the first electronic content.

In some implementations, first electronic content can be stored by a third computer system. The third computer system can transmit the first electronic content to the second computer system upon receiving a second authorization message from the first computer system indicating that the first computer system is authorized to access the first electronic content.

Other implementations are directed to systems, devices and non-transitory, computer-readable mediums (e.g., for performing one or more of the techniques described herein). As an example, in an aspect, a system for performing one or more of the techniques described herein can include one or more processors, and one or more non-transitory computer-readable media including one or more sequences of instructions which, when executed by the one or more processors, causes the performance of one or more of the techniques described herein. As another example, in another aspect, one or more non-transitory computer-readable media can include one or more sequences of instructions which, when executed by one or more processors, causes the performance of one or more of the techniques described herein.

The details of one or more embodiments are set forth in the accompanying drawings and the description below. Other features and advantages will be apparent from the description and drawings, and from the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a diagram of an example system for regulating access to electronic content using usage telemetry.

FIG. **2** is a diagram of an example content management platform.

FIGS. **3**A-**3**F are diagrams of an example usage of a system for regulating access to electronic content using usage telemetry.

FIGS. **4**A-**4**B are diagrams of another example usage of a system for regulating access to electronic content using usage telemetry.

FIG. **5** is a diagram of an example technique for determining a cost associated with the retrieval and/or use of multiple electronic content items.

FIG. **6** is a diagram of another example technique for determining a cost associated with the retrieval and/or use of multiple electronic content items.

FIG. **7** is a diagram of another example technique for determining a cost associated with the retrieval and/or use of multiple electronic content items.

FIG. **8** is a flow chart diagram of an example process for regulating access to electronic content using usage telemetry.

FIG. **9** is a diagram of an example computer system.

DETAILED DESCRIPTION

A content management platform can dynamically regulate access to electronic content using usage telemetry data. For instance, a content management platform can store electronic content items (e.g., data files, images, computerized models, and/or other electronic data), and make the electronic content items available to one or more other computer systems (e.g., one or more client computer systems) for retrieval and use. Further, the content management platform can monitor the retrieval and use of the electronic content items by the client computer systems, and regulate access to the electronic content items based on the information.

For instance, the content management platform can collect usage telemetry data describing the manner in which particular electronic content items are retrieved and used by each of the client computer systems (e.g., the number of times that electronic content items are retrieved, the period of time that the electronic content items are used by the client computer systems, the nature of the use, etc.). Further, the content management platform can dynamically regulate the access to the electronic content items based on the usage telemetry data (e.g., dynamically provide access to certain electronic content items by certain client computer systems, restrict access to certain electronic content items by certain client computer systems, and/or allocate resources to one or more entities based on usage patterns).

As an example, the content management platform can store computerized models representing particular components of electrical, mechanical, and/or chemical systems, and make the computerized models available for retrieval and use by one or more client computer systems. A client computer system can retrieve a particular computerized model from the content management platform, display the computerized model to a user, modify the computerized model, incorporate the computerize model into other electronic content (e.g., insert the computerized model into other computerized models), and/or perform one or more operations using the computerized model (e.g., execute a simulation analysis using the computerized model to simulate the characteristics of the component under various conditions).

Further, the content management platform can collect usage telemetry data describing the retrieve and usage of the computerized model by the client computer system. For example, the content management platform can collect telemetry data describing the time at which the computerized model was retrieved by the client computer system, the number of times that it was retrieved by the client computer system, whether the computerized model was shared by the client computer system with others, etc. Further, the content management platform can collect telemetry data describing whether the computerized model was displayed to a user (e.g., whether the contents of the computerized model were

presented to a user on a display device), and if so, the length of time that it was displayed. Further, the content management platform can collect telemetry data describing whether the computerized model was modified (e.g., whether the computer code, the parameters, or other attributes of the computerized model were altered), and if so, the nature of the modification. Further, the content management platform can collect telemetry data describing whether the computerized model was incorporated into other electronic content (e.g., inserted into another computer model), and if so, the nature of the incorporation (e.g., the number of times that it was incorporated into another computer model, the identity of the other computer model, etc.). Further, the content management platform can collect data describing whether any operations were performed using the computerized model (e.g., whether the computerized model was used in during the execution of a simulation analysis), and if so, the nature of the operations.

Further, the content management platform can dynamically regulate the access to the computerized model based on the usage telemetry data. For example, while the client computer system is using the computerized model, the content management system can restrict access by the client computer system to certain other computerized models (e.g., to moderate the consumption of resources by the client computer system). As another example, the content management system can allocate resources to one or more entities based on usage patterns (e.g., assess fees to entities associated with the client computer system, provide royalties or reimbursements to the owners of the computerized model, etc.).

The implementations described herein can provide a variety of benefits. For example, the content management platform can automatically manage access to electronic contents items based on the dynamic usage characteristics of each of the client computer systems. Accordingly, the content management platform can automatically adapt the distribution of electronic content items to account for variations in the operation of each of the client computer systems, without the need for manual human intervention. Thus, electronic content items can be distributed and used more effectively and efficiently in a wide array of technical environments.

An example system **100** for regulating access to electronic content using usage telemetry data is shown in FIG. **1**. The system **100** includes a content management platform **150** maintained on a server computer system **102** that includes one or more server computers.

The server computer system **102** is illustrated as a respective single component. However, in practice, it can be implemented on one or more computing devices (e.g., each computing device including at least one processor such as a microprocessor or microcontroller). A server computer system **102** can be, for instance, a single computing device that is connected to the network **106**, and the content management platform **150** can be maintained and operated on the single computing device. In some implementations, the server computer system **102** can include multiple computing devices that are connected to the network **106**, and the content management platform **150** can be maintained and operated on some or all of the computing devices. For instance, the server computer system **102** can include several computing devices, and the content management platform **150** can be distributive on one or more of these computing devices. In some implementations, the server computer system **102** need not be located locally to the rest of the system **100**, and portions of a server computer system **102** can be located in one or more remote physical locations.

The server computer system **102** is communicatively connected to client computer systems **104***a-c* using the network **106**. Each client computer system **104***a-c* includes a respective user interface **108***a-c*. Users interact with the user interfaces **108***a-c* to view data (e.g., data on the server computer system **102** and the platform **150**, and/or data on other the client computer systems **104***a-c*). Users also interact with the user interfaces **108***a-c* to transmit data to other devices (e.g., to the server computer system **102** and the platform **150**, and/or to the other client computer systems **104***a-c*). Users interact with the user interfaces **108***a-c* to issue commands (e.g., to the server system **102** and the platform **150**, and/or to the other client devices **104***a-c*). Commands can be, for example, any user instruction to the server computer system **102** and/or to the other client computer systems **104***a-c*. In some implementations, a user can install a software application onto a client computer system **104***a-c* in order to facilitate performance of these tasks.

A client computer system **104***a-c* can be any electronic device that is used by a user to view, process, transmit and receive data. Examples of the client computer systems **104***a-c* include computers (such as desktop computers, notebook computers, server systems, etc.), mobile computing devices (such as cellular phones, smartphones, tablets, personal data assistants, notebook computers with networking capability), and other computing devices capable of transmitting and receiving data from the network **106**. The client dev computer systems ices **104***a-c* can include devices that operate using one or more operating system (e.g., Microsoft Windows, Apple OS X, Linux, Unix, Android, Apple iOS, etc.) and/or architectures (e.g., x86, PowerPC, ARM, etc.) In some implementations, one or more of the client computer systems **104***a-c* need not be located locally with respect to the rest of the system **100**, and one or more of the client computer systems **104***a-c* can be located in one or more remote physical locations. In some implementations, the client computer systems **104***a-c* can communicate with a geo-positioning system (e.g., a global positioning system [GPS], Wi-Fi triangular system, and so forth) in order to determine its geographical location.

The server computer system **102** is also communicatively connected to content computer systems **110***a* and **110***b* using the network **106**. The content computer systems **110***a* and **110***b* store electronic content items (e.g., one or more data files, images, audio files, video files, computerized models, text files, and/or other electronic content). Each content computer system **110***a* and **110***b* is illustrated as a respective single component. However, in practice, a content computer system **110***a* or **110***b* can be implemented on one or more computing devices (e.g., each computing device including at least one processor such as a microprocessor or microcontroller). A content computer system **110***a* or **110***b* can be, for instance, a single computing device that is connected to the network **106**. In some implementations, a content computer system **110***a* or **110***b* can include multiple computing devices that are connected to the network **106**. In some implementations, the content computer system **110***a* and **110***b* need not be located locally to the rest of the system **100**, and portions of the content computer system **110***a* and **110***b* can be located in one or more remote physical locations.

The network **106** can be any communications network through which data can be transferred and shared. For example, the network **106** can be a local area network

(LAN) or a wide-area network (WAN), such as the Internet. The network **106** can be implemented using various networking interfaces, for instance wireless networking interfaces (such as Wi-Fi, Bluetooth, or infrared) or wired networking interfaces (such as Ethernet or serial connection). The network **106** also can include combinations of more than one network, and can be implemented using one or more networking interfaces.

FIG. **2** shows various aspects of the content management platform **150**. The content management platform **150** includes several modules that perform particular functions related to the operation of the system **100**. For example, the content management platform **150** can include a database module **202**, a transmission module **204**, and a processing module **206**.

The database module **202** stores electronic content items **210** that can be retrieved by the client computer systems **104***a-c*. For example, the database module **202** can store one or more data files, images, audio files, video files, computerized models (e.g., CAD models, CAE models, etc.), text files, and/or other electronic content. In some cases, at least some of the electronic content items stored by the database module **202** are obtained from the content computer systems **110***a* and/or **110***b*. Further, the database module **202** can store information describing the electronic content items. For example, the database module **202** can store, for each electronic content item, the source of the electronic content item, a description of the contents of the electronic content item, and/or an amount of resources associated with the electronic content item (e.g., a unit cost, credit cost, monetary cost, etc. for retrieving and/or using the electronic content item). As another example, if the electronic content item is a computerized model of a component or system, the database module **202** can store a description of the component or system, an indication of a category or classification of the component or system, and/or other information regarding the component or system.

In some cases, the amount of resources associated with the electronic content item can differ, depending on how the electronic content item is used. For instance, a particular electronic content item can be associated with a first cost for a first type of usage (e.g., N_1 units for viewing the content item), a second cost for a second type of usage (e.g., N_2 units for modifying the content item), a third cost for a third type of usage (e.g., N_3 units for including the content item other content), a fourth cost for a fourth type of usage (e.g., N_4 units for executing a simulation analysis using the content item), and so forth.

In some cases, the amount of resources associated with the electronic content item can differ, depending on how often electronic content item is used. For instance, a particular electronic content item can be associated with a cost per instance of usage and/or a cost that varies according to time. As an example, the electronic content item can be associated with a cost of N_5 each time the electronic content item is used in a particular way. As another example, the electronic content item can be associated with a cost of N_6 for each second that the electronic content item is used in a particular way.

In some cases, the each electronic content item can be associated with a particular royalty or reimbursement to be paid to a particular entity (e.g., the owner of the electronic content item) based on a usage of the electronic content item. For instance, a particular electronic content item can be associated with a first royalty for a first type of usage (e.g., R_1 units for viewing the content item), a second royalty for a second type of usage (e.g., R_2 units for modifying the content item), a third royalty for a third type of usage (e.g., R_3 units for including the content item other content), a fourth royalty for a fourth type of usage (e.g., R_4 units for executing a simulation analysis using the content item), and so forth.

Further, the royalty associated with the electronic content item can differ, depending on how often electronic content item is used. For instance, a particular electronic content item can be associated with a royalty per instance of usage and/or a royalty that varies according to time. As an example, the electronic content item can be associated with a royalty of R_5 each time the electronic content item is used in a particular way. As another example, the electronic content item can be associated with a royalty of R_6 for each second that the electronic content item is used in a particular way.

The database module **202** also stores user access profile **212** related to one or more users of the system **100**. As an example, the database module **202** can store information regarding the users of the client computer systems **104***a-c* and/or the content computer systems **110***a* and **110***b*, such as the users' identity credentials (e.g., user names and passwords), contact information (e.g., e-mail addresses, physical addresses, phone numbers, and so forth), geographical locations, or other information. As another example, the database module **202** can store information describing access permissions granted to the users by the content management platform **150**. For instance, the database module **202** can store information indicating whether each user has permission to retrieve electronic content items from the content management platform **150**, and if so, the specific electronic content items to which the user has access. As another example, the database module **202** can store information describing resources associated with the user. For instance, the database module **202** can store information indicating a pool of available resources available to a user (e.g., units, credits, monetary funds, etc.). As another example, the database module **202** can store information describing financial accounts associated with the user (e.g., a bank account, deposit account, credit card account, etc.).

The database module **202** also stores usage telemetry data **214** describing the retrieval and/or use of the electronic content items by the client computer systems **104***a-c* and/or their users. As an example, the usage telemetry data **214** can include, for each electronic content item, an indication of the time at which the computerized model was retrieved by a particular client computer system, an indication of the number of times that it was retrieved by the client computer system, whether the computerized model was shared by the client computer system with others, etc. Further, the usage telemetry data **214** can include, for each electronic content item, an indication whether the electronic content was displayed to a user (e.g., whether the contents of the electronic content item were presented to a user on a display device), and if so, the length of time that it was displayed. Further, the usage telemetry data **214** can include, for each electronic content item, an indication whether the electronic content item was modified (e.g., whether the computer code, the parameters, or other attributes of the electronic content item were altered), and if so, the nature of the modification. Further, the usage telemetry data **214** can include, for each electronic content item, an indication whether the electronic content item was incorporated into other electronic content (e.g., inserted into another electronic content, such as a computerized model), and if so, the nature of the incorporation (e.g., the number of times that it was incorporated into other electronic content, the identity of the other electronic

content, etc.). Further, the usage telemetry data **214** can include, for each electronic content item, an indication whether any operations were performed using the electronic content item (e.g., whether the electronic content item was used in during the execution of a simulation analysis), and if so, the nature of the operations. In some cases, the usage telemetry data **214** can be collected by one or more of the client computer systems **104***a-c* and transmitted to the content management platform **150**. In some cases, the usage telemetry data **214** can be directly generated by the content management platform **150** (e.g., by monitoring the operation of the client computers **104***a-c* via the communications network **106**).

Although different examples of information are described above, these are merely illustrative. In practice, the database module **202** can store any information related to the users of the platform **150**, the electronic content items, or any other information pertaining to the platform **150**.

Further, the database module **202** can execute database queries **216**. Database queries can be, for example, commands that specify that particular data be retrieved, modified, and/or deleted from the database module **202**. In response, the database module **202** can execute the queries to fulfill the request, or direct another component of the content management platform **150** to execute the query. In some cases, database queries **216** can be generated by the processing module **206** (e.g., based on a user's instructions), and transmitted to the database module **202** for execution. In some cases, database queries **216** can be generated and executed by the processing module **206** directly (e.g., the processing module **206** can directly retrieve, modify, and/or delete data stored in the database module **202**).

In some cases, the database module **202** can process data stored in the database module **202** in accordance with one or more data processing rules **218**. These data processing rules **218** can specify particular conditions and/or factors for processing data, such that the data stored in the database module **202** is more useful to a user and/or is stored more efficiently by the content management platform **150**. As an example, the data processing rules **218** can specify how certain electronic content items **210** can be retrieved and/or modified based on a user's instructions, user access profile **212**, and/or usage telemetry data **214**. The data processing rules **218** also can be stored by the database module **202**. Example implementations of the data processing rules **218** are discussed in greater detail below.

The transmission module **204** allows for the transmission of data to and from the content management platform **150**. For example, the transmission module **204** can be communicatively connected to the network **106**, such that it can transmit data to the client computer systems **104***a-c*, and receive data from the client computer systems **104***a-c* via the network **106**. As an example, information inputted by users on the client computer systems **104***a-c* can be transmitted to the content management platform **150** through the transmission module **204**. This information can then be processed (e.g., using the processing module **206**) and/or stored (e.g., using the database module **202**). As another example, information from the content management platform **150** (e.g., information stored on the database module **202**) can be transmitted to the client computer systems **104***a-c* through transmission module **204**.

The processing module **206** processes data stored or otherwise accessible to the content management platform **150**. For instance, the processing module **206** can execute automated or user-initiated processes that manipulate data pertaining to one or more users or electronic content items. As an example, the processing module **206** can generate and then transmit database queries **216** to database module **202** to retrieve, modify, and/or delete data stored on the database module **202**. As another example, the processing module **206** can generate and execute the database queries **216** directly (e.g., the processing module **206** can execute the database queries **216** to directly retrieve, modify, and/or delete data stored in the database module **202**). Further, the processing module **206** can process data that is received from the transmission module **204**. Likewise, processed data from the processing module **206** can be stored on the database module **202** (e.g., using one or more database queries **216**) and/or sent to the transmission module **204** for transmission to other devices. Example processes that can be performed by the processing module **206** are described in greater detail below.

In some cases, the database module **202** and/or the processing module **206** can process data stored in the database module **202** in accordance with one or more data processing rules **218**. These data processing rules **218** can specify particular operations that are performed with respect to the data stored by the database module **202** based on particular conditions, criteria, and/or factors. In some cases, data that is processed in accordance with these rules can be rendered more useful to a user and/or can be stored more efficiently by the content management platform **150**. As an example, the data processing rules **218** can specify how certain electronic content items can be accessed and/or modified based on a user's instructions, user access profile **212**, and/or usage telemetry data **214**. In some cases, the data processing rules **218** can be stored by the processing module **206** (e.g., so that the processing module **206** can directly access the processing rules **218**). In some cases, the data processing rules **218** can be stored by the database module **202**. Example implementations of the data processing rules **218** are discussed in greater detail below.

As described above, one or more implementations of the content management platform **150** enable a user to regulate access to electronic content using usage telemetry data. An example of this functionality is illustrated in FIGS. **3**A-**3**F.

As shown in FIG. **3**A, the content computer systems **110***a* and **110***b* transmit content **300** to the server computer system **102** and the content management platform **150** via the network **106**. The content **300** can include, for example, one or more electronic content items (e.g., one or more data files, images, audio files, video files, computerized models, text files, and/or other electronic content). The content computer systems **110***a* and **110***b* can transmit the content **300** continuously, periodically, intermittently, or according to some other pattern. In some cases, the content computer systems **110***a* and **110***b* can be operated by a different entity or a different group of entities than the operator of the content management platform **150**. As an example, the content computer systems **110***a* and **110***b* can be operated by a content provider (e.g., an entity that produces electronic content items), and the content management platform **150** can be operated by a content manager (e.g., an entity that manages and distributes electronic content items on behalf of others).

The content management platform **150** stores the transmitted content **300** and makes the content **300** available to other systems (e.g., one or more of the client computer systems **104***a-c*) for retrieval. As shown in FIG. **3**B, a client computer system **104***a* can request some or all of the content **300** by transmitting a request **302** to the server computer system **102** and the content management platform **150** via the network **106**. The request **302** can include information

identifying the client computer system **104***a* and/or a user of the client computer system **104***a* (e.g., an account associated with the user, access credentials, etc.). Further, the request **302** can include information identifying the specific content being requested (e.g., the identity of one or more particular data files, images, audio files, video files, computerized models, text files, and/or other electronic content). In some cases, multiple pieces of content can be requested at once (e.g., a package of several pieces of content, library of several pieces of content, a compressed file containing several pieces of content, etc.).

As shown in FIG. **3**C, upon receipt of the request **302**, the content management platform **150** determines whether the authorize access to the request content by the client computer system **104***a*. The content management platform **150** can make this determination using a variety of different techniques. In some cases, the content management platform **150** can determine a cost associated with the requested content (e.g., units, credits, monetary funds, etc.), and compare the cost of an amount of available resources associated with the client computer system **104***a* and/or its user (e.g., a pool of units, credit, monetary funds, etc. available for use). If the cost is lesser than or equal to the amount of available resources, the content management platform **150** can authorize access by the client computer system **104***a* and/or its user. In some cases, the content management platform **150** can also deduct the cost of the content from the amount of available resources associated with the client computer system **104***a* and/or its user.

As another example, the content management platform **150** can determine whether the client computer system **104***a* and/or its user is "whitelisted" with respect to the requested content, and if so, authorize access to the content by the client computer system **104***a* and/or its user. For instance, the content management platform **150** can maintain a database that includes, for each electronic content item, a list of computer systems and/or users that are authorized the access the electronic content item. The content management platform **150** can identify the client computer system **104***a* and/or its user based on the information included in the request **302**, ascertain whether the client computer system **104***a* and/or its user is listed as an authorized user, and if so, authorize access.

As another example, the content management platform **150** can determine whether the client computer system **104***a* and/or its user is "blacklisted" with respect to the requested content, and if not, authorize access to the content by the client computer system **104***a* and/or its user. For instance, the content management platform **150** can maintain a database that includes, for each electronic content item, a list of computer systems and/or users that are not authorized the access the electronic content item. The content management platform **150** can identify the client computer system **104***a* and/or its user based on the information included in the request **302**, ascertain whether the client computer system **104***a* and/or its user is listed as an unauthorized user, and if not, authorize access.

As shown in FIG. **3**D, upon determining that the client computer system **104***a* and/or its user is authorized to access the transmitted content, the content management platform **150** transmits an access authorization message **304** to the client computer **104***a*. The access authorization message **304** can include, for example, a confirmation of the access authorization, the time that authorization was granted, and/or the period of time for which access is valid. Further, the access authorization message **304** can include information regarding any adjustments made to the account associated with the client computer system **104***a* and/or its user (e.g., a deduction in the amount of available resources associated with the client computer system **104***a* and/or its user). Further, the access authorization message **304** can include information indicating any usage restrictions with respect to the request content. For example, the access authorization message **304** can include indications that the requested content can only be included in certain other types of content (e.g., an image can be used as a part of another image, but not in a video). As another example, the access authorization message **304** can indicate whether the request content can be modified by the computer system **104***a* and/or its user.

As shown in FIG. **3**E, the client computer system **104***a* retrieves the requested content **306** from the server computer system **102** and the content management platform **150** via the network **106**. In some cases, the client computer system **104***a* can automatically retrieve the requested content **306** upon receipt of the access authorization message **304**. In some cases, the client computer system **104***a* can retrieve the requested content **306** in response to manual input by a user (e.g., a user instruction to the client computer system **104***a* to retrieve the requested content **306**). In some cases, the client computer system **104***a* can retrieve multiple pieces at once (e.g., a package of several pieces of content, library of several pieces of content, a compressed file containing several pieces of content, etc.).

In some cases, if the requested content **306** is incorporated into other electronic content, the client computer system **104***a* can automatically retrieve the latest version of the requested content **306** when the other electronic content is accessed by the user. For example, the requested content can include a first computerized model representing a particular component or sub-system. A user can incorporate the first computerized model into a second computerized model representing a larger system (e.g., to simulate the characteristics of the larger system based on the simulated characteristics of the particular component or sub-system). In subsequent sessions, when the user re-opens or re-accesses the second computerized model, the client computer system **104***a* can automatically determine whether the content management platform **150** has made a more recent version of the first computerized model available to for access. If so, the client computer system **104***a* can retrieve the more recent version of the first computerized model from the content management platform **150**, and automatically incorporate the more recent version of the first computerized model into the second computerized model. This can be beneficial, for example, as any revisions to the content (e.g., revisions to correct errors in the content, improve performance of the content, etc.) are automatically retrieved and incorporated into user's existing works, without requiring manual intervention by a user. Accordingly, the performance of the client computer system **104***a* can be automatically improved.

After retrieving the requested content **306**, the client computer system **104***a* can use the requested content **306** to produce additional content (subject to any restrictions established by the content management platform **150**). For example, if the requested content **306** is an image, the client computer system **104***a* can incorporate the image into one or more images, videos, animations, etc. As another example, if the requested content **306** is an audio file, the client computer system **104***a* can incorporate the audio into one or more audio segments, videos, animations, etc. As another example, if the requested content **306** is a computerized model, the client computer system **104***a* can incorporate the computerized model into one or more other computerized models.

Further, the client computer system **104***a* can perform one or more operations using the requested content **306**. For example, the client computer system **104***a* can present some or all of the requested content **306** to a user. As another example, the client computer system **104***a* can modify the requested content **306** (e.g., based on user commands or automatically). As another example, if the requested content **306** is a computerized model, the client computer system **104***a* can execute a simulation analysis using the computerized model. As another example, the client computer system **104***a* can share the requested content **306** to others (e.g., via the network **106**).

In some cases, the client computer system **104***a* can retrieve the requested content **306**, and use the requested content **306** one or more times without re-retrieving the requested content **306** (e.g., from the content management platform **150**). In some cases, each time the requested content **306** is used again, the client computer system **104***a* can transmit an access request to the content management platform **150** (e.g., in a similar manner as described with respect to FIG. **3**B). Upon determining that the client computer system **104***a* is still authorized the access the content, the content management platform **150** can transmit another access authorization message to the client computer system **104***a* granting access to the requested content **306**. In some cases, the client computer system **104***a* can include a software agent that selectively enables access to requested content upon receipt of an access authorization message from the content management platform and selectively disables access to requested content in the absence of an access authorization message prior to use of the requested content.

The client computer system **104***a* also generates usage telemetry data describing the retrieval and/or use of the requested content **306** by the client computer system **104***a* and/or its user. As an example, the usage telemetry data can include an indication of the identity of the requested content **306** being used (e.g., a unique name, serial number, key number, or other identifier of the content or collection of being used). As an example, the usage telemetry data can include an indication of the time at which the requested content **306** was retrieved by the client computer system **104***a*, an indication of the number of times that it was retrieved by the client computer system **104***a*, whether the requested content **306** was shared by the client computer system **104***a* with others, etc. Further, the usage telemetry data can include an indication whether the requested content **306** was displayed to a user (e.g., whether the contents of the requested content **306** were presented to a user on a display device), and if so, the length of time that it was displayed. Further, the usage telemetry data can include an indication whether the requested content **306** was modified (e.g., whether the computer code, the parameters, or other attributes of the electronic content item were altered), and if so, the nature of the modification. Further, the usage telemetry data can include an indication whether the requested content **306** was incorporated into other electronic content (e.g., inserted into another electronic content, such as a computerized model), and if so, the nature of the incorporation (e.g., the number of times that it was incorporated into other electronic content, the identity of the other electronic content, etc.). Further, the usage telemetry data can include an indication whether any operations were performed using the requested content **306** (e.g., whether the requested content **306** was used in during the execution of a simulation analysis), and if so, the nature of the operations.

As shown in FIG. **3**F, the client computer system **104***a* transmits the usage telemetry data **308** to the server computer system **102** and the content management platform **150**. The content management platform **150** dynamically modifies the access authorization for the client computer system **104***a* and/or its user based on the transmitted usage telemetry data **308**.

In some cases, the client computer system **104***a* can generate the usage telemetry data **308** continuously, intermittently, periodically, or according to some other pattern. Further, the client computer system **104***a* can transmit the usage telemetry data **308** to the server computer system **102** and the content management platform **150** continuously, intermittently, periodically, or according to some other pattern. In some cases, the client computer system **104***a* can continuously "stream" the usage telemetry data **308** to the server computer system **102** and the content management platform (e.g., to transmit usage information in real time or near real time). In some cases, the client computer system **104***a* can transmit the usage telemetry data **308** to the server computer system **102** and the content management platform **150** in response to a particular trigger event (e.g., an end of a usage session of the requested data, such as the closing of a file, project, content including the requested content, or the closing of a program used to view and/or use the requested content).

The content management platform **150** can dynamically modify the access authorization for the client computer system **104***a* and/or its user using various techniques. For instance, the content management platform **150** can determine the amount of resources associated with the requested content **306** based on the usage of the requested content **306**, and dynamically adjust the resources available to the client computer system **104***a* and/or its user in response. For example, requested content can be associated with a first cost for a first type of usage (e.g., N_1 units for viewing the requested content), a second cost for a second type of usage (e.g., N_2 units for modifying the requested content), a third cost for a third type of usage (e.g., N_3 units for including the requested content other content), a fourth cost for a fourth type of usage (e.g., N_4 units for executing a simulation analysis using the requested content), and so forth. Open receiving usage telemetry data indicating that the requested content **306** is being viewed, the content management platform **150** can determine whether the amount of resources available to the client computer system **104***a* and/or its user is sufficiently high to enable such usage (e.g., whether the amount of available resources is greater than or equal to N_1). If so, the content management platform **150** can authorize the use (e.g., by transmitting an access authorization message, or otherwise not interrupting the use). If not, the content management platform **150** can de-authorize the client computer system **104***a* from using the requested content in this manner (e.g., by transmitting an access authorization message restricting the use). In some cases, the content management platform **150** can also deduct the cost of the requested content from the amount of available resources associated with the client computer system **104***a* and/or its user during the use. In some cases, the content management platform **150** can also refund the cost of the requested content after use of the requested content is discontinued. Although example types of usage and costs are described above, these are merely illustrative examples. In practice, requested content can be associated with any number of different costs corresponding to any number of different types of usage.

As another example, requested content can be associated with a cost of N_5 each time the requested content is used in a particular way. Open receiving usage telemetry data indi-

cating that the requested content **306** is being used in that way, the content management platform **150** can determine whether the amount of resources available to the client computer system **104***a* and/or its user is sufficiently high to enable such usage (e.g., whether the amount of available resources is greater than or equal to N_5). If so, the content management platform **150** can authorize the use (e.g., by transmitting an access authorization message, or otherwise not interrupting the use). If not, the content management platform **150** can de-authorize the client computer system **104***a* from using the requested content in this manner (e.g., by transmitting an access authorization message restricting the use). In some cases, the content management platform **150** can also deduct the cost of the requested content from the amount of available resources associated with the client computer system **104***a* and/or its user during the use. In some cases, the content management platform **150** can also refund the cost of the requested content after use of the requested content is discontinued.

As another example, requested content can be associated with a cost of N_6 for each second that the electronic content item is used in a particular way. Open receiving usage telemetry data indicating that the requested content **306** is being used in that way, the content management platform **150** can determine whether the amount of resources available to the client computer system **104***a* and/or its user is sufficiently high to enable such usage (e.g., whether the amount of available resources is greater than or equal to N_6 multiplied by the number of seconds that the requited content was used in that way). If so, the content management platform **150** can authorize the use (e.g., by transmitting an access authorization message, or otherwise not interrupting the use). If not, the content management platform **150** can de-authorize the client computer system **104***a* from using the requested content in this manner (e.g., by transmitting an access authorization message restricting the use). In some cases, the content management platform **150** can also deduct the cost of the requested content from the amount of available resources associated with the client computer system **104***a* and/or its user during the use. In some cases, the content management platform **150** can also refund the cost of the requested content after use of the requested content is discontinued.

Further, the content management platform **150** can dynamically allocate resources (e.g., royalties or reimbursements) to one or more entities based on the usage. For example, requested content can be associated with a first royalty for a first type of usage (e.g., R_1 units for viewing the requested content), a second royalty for a second type of usage (e.g., R_2 units for modifying the requested content), a third royalty for a third type of usage (e.g., R_3 units for including the requested content other content), a fourth royalty for a fourth type of usage (e.g., R_4 units for executing a simulation analysis using the requested content), and so forth. Open receiving usage telemetry data indicating that the requested content **306** is being viewed, the content management platform **150** can allocate R_1 units to an entity (e.g., an owner of the requested content). Although example types of usage and royalties are described above, these are merely illustrative examples. In practice, requested content can be associated with any number of different royalties corresponding to any number of different types of usage.

As another example, requested content can be associated with a royalty of R_5 each time the requested content is used in a particular way. Open receiving usage telemetry data indicating that the requested content **306** is being used in that way, the content management platform **150** can allocate R_5 units to an entity (e.g., an owner of the requested content).

As another example, requested content can be associated with a royalty of R_6 for each second that the electronic content item is used in a particular way. Open receiving usage telemetry data indicating that the requested content **306** is being used in that way, the content management platform **150** can allocate R_6 units to an entity (e.g., an owner of the requested content).

In the example shown in FIGS. **3**A-**3**F, the content management platform **150** stores and distributes content to the client compute systems **104***a-c* on behalf of the content computer systems **110***a* and **110***b*. However, this need not be the case. For instance, in some implementations, the content computer systems **110***a* and **110***b* can store and distribute content directly to the client compute systems **104***a-c*. In this configuration, the content management platform **150** can continue to regulate access to the content based on usage telemetry data. An example of this functionality is illustrated in FIGS. **4**A and **4**B.

In a similar manner as described with respect to FIGS. **3**B and **3**C, a client computer system **104***a* can transmit an access request to the server computer system **102** and the content management platform **150** via the network **106**. The request can include information identifying the client computer system **104***a* and/or a user of the client computer system **104***a* (e.g., an account associated with the user, access credentials, etc.). Further, the request can include information identifying the specific content being requested (e.g., the identity of one or more particular data files, images, audio files, video files, computerized models, text files, and/or other electronic content). Upon receipt of the request, the content management platform **150** determines whether the authorize access to the request content by the client computer system **104***a*.

As shown in FIG. **4**A, upon determining that the client computer system **104***a* and/or its user is authorized to access the transmitted content, the content management platform **150** transmits an access authorization message **400** to the client computer **104***a*. The access authorization message **400** can be similar to that described with respect to FIG. **3**D. For example, the authorization message **400** can include a confirmation of the access authorization, the time that authorization was granted, and/or the period of time for which access is valid. Further, the access authorization message **400** can include information regarding any adjustments made to the account associated with the client computer system **104***a* and/or its user (e.g., a deduction in the amount of available resources associated with the client computer system **104***a* and/or its user). Further, the access authorization message **400** can include information indicating any usage restrictions with respect to the request content. For example, the access authorization message **304** can include indications that the requested content can only be included in certain other types of content (e.g., an image can be used as a part of another image, but not in a video). As another example, the access authorization message **400** can indicate whether the request content can be modified by the computer system **104***a* and/or its user.

Further, the content management platform **150** can also transmit the access authorization message **400** to the content computer system storing the requested content (e.g., the content computer system **110***a*). Accordingly, the content computer system can distribute content to client computer system and/or user in accordance with the information included in the authorization message **400**, without the need

to independently determine whether a particular client computer system and/or user is authorized to retrieve and usage particular content.

As shown in FIG. **4**B, the client computer system **104***a* retrieves the requested content **402** from the content computer system **100***a*. In some cases, the client computer system **104***a* can automatically retrieve the requested content **402** upon receipt of the access authorization message **400**. In some cases, the client computer system **104***a* can retrieve the requested content **402** in response to manual input by a user (e.g., a user instruction to the client computer system **104***a* to retrieve the requested content **402**). In a similar manner as described with respect to FIG. **3**E, the client computer system can incorporate the requested content into other electronic content and/or one or more operations using the requested content.

Similarly, in a similar manner as described with respect to FIGS. **3**E and **3**F, the client computer system **104***a* can also generate usage telemetry data describing the retrieval and/or use of the requested content by the client computer system **104***a* and/or its user, and transmit the usage telemetry data to the content management platform **150**. The content management platform **150** dynamically modifies the access authorization for the client computer system **104***a* and/or its user based on the transmitted usage telemetry data.

In some cases, the content management platform **150** can transmit one or more additional access authorization messages to the client computer system **104***a* and/or the content computer system **110***a* to notify those systems regarding any modifications. For example, if the client computer system **104***a* and/or its user are no longer authorized to access a particular electronic content item (e.g., due to changes in usage patterns, available resources, etc.), the content management platform **150** can transmit an access authorization message to the client computer system **104***a* and/or the content computer system **110***a* indicating this change in access. Based on the message, the content computer system **110***a* can discontinue access to the content by the client computer system **104***a*. As another example, if the client computer system **104***a* and/or its user are again authorized to access a particular electronic content item (e.g., due to changes in usage patterns, available resources, etc.), the content management platform **150** can transmit another access authorization message to the client computer system **104***a* and/or the content computer system **110***a* indicating this change in access. Based on the message, the content computer system **110***a* can again allow access to the content by the client computer system **104***a*.

As described herein, each electronic content item can be associated with an amount of resources corresponding to the retrieval and/or use of the electronic content item (e.g., a resource cost). In some cases, if a client computer system retrieves and/or uses multiple electronic content items, the total cost that is assessed to a user's account can be determined based on "stacking" and/or "leveling" techniques.

FIG. **5** shows an example stacking technique of determining resource costs. In this example, nine content items A1-A3, B1-B3, and C1-C3 are made available for retrieval and use. Further, the content items are organized according to different domains A, B, and C. The domains can correspond, for instance, to different categories, classifications, types, collections, or libraries of the content items. As an example, if the content items are computerized models, the domains A, B, and C could correspond to different types of computerized models. For instance, domain A and content items A1-A3 can correspond to computerized models of engines used in vehicles, domain B and content items B1-B3 can correspond to electrical sub-systems used in vehicles, and domain C and content items C1-C3 can correspond to the environmental regulation sub-systems used in vehicles. Further, each domain is associated with a particular cost. In this example, domain A is associated with a cost of 15 units for retrieval and/or use of each content item A1-A3, domain B is associated with a cost of 10 units for retrieval and/or use of each content item B1-B3, and domain C is associated with a cost of 20 units for retrieval and/or use of each content item C1-C3.

If a client computer system retrieves and/or uses multiple electronic content items, the total cost is determined by summing the cost of each of the individual electronic content items that were retrieved and/or used (e.g., "stacking" the total costs together). In this example, a user retrieves and uses content items A2 (corresponding to a cost of 15 units), B1 (corresponding to a cost of 10 units), and B2 (corresponding to a use of 10 units). Accordingly, the total cost for retrieval and usage of these content items is 45 units (e.g., 15+10+10 units).

FIG. **6** shows an example leveling technique of determining resource costs. In this example, three content items A1-A3 are made available for retrieval and use. The content items A1-A3 are organized according to a single domain A. Further, the domain A is associated with a cost of 15 units for retrieval and/or use of any number of the content items A1-A3. Accordingly, the cost of retrieving and/or using of content items from the domain A are set to a particular "level," regardless of how many different content items are retrieved and/or used from the domain A.

If a client computer system retrieves and/or uses multiple electronic content items from a common domain, the total cost is the cost associated with that domain—regardless if only a single content item was retrieved and used from that domain, or if multiple content items were retrieved and used from that domain. In this example, a user retrieves and uses content items A1 and A2. Accordingly, the total cost for retrieval and usage of these content items is 15 units (e.g., as both of the content items are from the same domain A).

FIG. **7** shows an example technique of determine resource costs based on a combination of stacking and leveling techniques. In this example, the cost of retrieving and/or using content items from a particular domain are "leveled." Accordingly, if a client computer system retrieves and/or uses multiple electronic content items from a common domain, the total cost is the cost associated with that domain—regardless if only a single content item was retrieved and used from that domain, or if multiple content items were retrieved and used from that domain. However, the cost of retrieving and/or using content items from different domains are "stacked." Accordingly, if a client computer system retrieves and/or uses multiple electronic content items from different domains, the total cost is the sum of the cost of each domain from which content was retrieved and/or used.

In this example, in a similar manner as in FIG. **5**, nine content items A1-A3, B1-B3, and C1-C3 are made available for retrieval and use. Similarly, the content items are organized according to different domains A, B, and C, where domain A is associated with a cost of 15 units for retrieval and/or use of any number of content items A1-A3, domain B is associated with a cost of 10 units for retrieval and/or use of any number of content items B1-B3, and domain C is associated with a cost of 20 units for retrieval and/or use of any number of content item C1-C3.

If a client computer system retrieves and/or uses multiple electronic content items, the cost of retrieving and/or using

content items from a particular domain are "leveled," while the cost of retrieving and/or using content items from different domains are "stacked." In this example, a user retrieves and uses content items A2, B1, and B2. Accordingly, the total cost for retrieval and usage of these content items is 25 units (e.g., 15 units associated with the domain A, plus 10 units associated with the domain B).

Although FIGS. **5-7** show example domains, content items, and costs, these are merely illustrative examples. In practice, a content management system can manage any number of content items, organize those content items according to any number of domains, and associate any number of different costs to the content items. Further, although FIGS. **5-7** show example costs associated with the retrieval and/or use of a content item, these are also merely illustrative examples. As described herein, each content item can be associated with multiple different costs, depending on the circumstances (e.g., costs that vary depending on how the content item is used, how often the electronic content item is used, etc.).

Example Processes

An example process **800** for regulating access to electronic content using usage telemetry data is shown in FIG. **8**. The process **800** can be performed for example, using one or more computer systems, as described herein.

In the process **800**, a first computer system receives a request for access to first electronic content from a second computer system (step **802**). The second computer system is associated with an access profile. As an example, the first computer system can be the server computer system **102** including the content management platform **150** shown and described with respect to FIGS. **1-4**. As another example, the second computer system can be the client computer system **104***a* shown and described with respect to FIGS. **1-4**. The first electronic content can include a data object for use in a computerized model, an image, a video, audio, and/or textual data.

The first computer system determines that the second computer system is authorized to access the first electronic content based on the based on the access profile (step **804**). Example techniques for making this determination are described, for example, with respect to FIG. **3**C.

Further, the first computer system transmits a first authorization message to the second computer system (step **806**). The first authorization message indicates that the second computer system is authorized to access the first electronic content. Example techniques for transmitting authorization messages are described, for example, with respect to FIGS. **3**D and **4**A.

The first computer system receives content usage telemetry data from the second computer system (step **808**). The content usage telemetry data includes one or more data items indicating metrics of use of the first electronic content by the second computer system. In some cases, the content usage telemetry data can include one or more data items indicating a length of time that the electronic is in use by the second computer system. In some cases, the content usage telemetry data can include one or more data items indicating one or more types of usage of the first electronic content by the second computer system. The content usage telemetry data can include one or more data items indicating, for each type of usage of the first electronic content by the second computer system, a length of time that the electronic is in use by the second computer system according to that type of usage. Example usage telemetry data is described, for example, with respect to FIGS. **2** and **3**F.

The one or more types of usage can include including the first electronic content in second electronic content, presenting the first electronic content to a user, and/or performing one or more data processing techniques with respect to the first electronic content. In some cases, including the first electronic content in the second electronic content can include including the first electronic content in a computerized model. In some cases, presenting the first electronic content the user can include displaying at least a portion of the first electronic content to the user using a display device. In some cases, performing one or more data processing techniques with respect to the first electronic content can include including the first electronic content in a computerized model and simulating an operation of an apparatus using the computerized model.

In some cases, the content usage telemetry data can be received periodically by the first computer system from the second computer system. In some cases, the content usage telemetry data can be received continuously by the first computer system from the second computer system.

In some cases, the content usage telemetry data can be transmitted by the second computer system to the first computer system in response to a trigger event. The trigger event can be an end of a usage session of the first electronic content.

The first computer system modifies the access profile of the second computer system based on the content usage telemetry data (step **810**). Example techniques for modifying an access profile are described, for example, with respect to FIGS. **2** and **3**F.

In some cases, the access profile includes an indication of a number of licensing units available for use by the second computer system. Determining that the second computer system is authorized to access the first electronic content can include determining that the number of licensing units available for use by the second computer system is greater than or equal to a number of licensing units associated with the first electronic content. Further, the number of licensing units available for use by the second computer system can be reduced by the number of licensing units associated with the first electronic content responsive to the request. Further, modifying the access profile of the second computer system based on the content usage telemetry data can include increasing or decreasing the number of licensing units available for use by the second computer system based on the content usage telemetry data.

In some implementations, the process can also include determining an amount of funds associated with usage of the first electronic content by the second computer system based on the content usage telemetry data.

In some implementations, first electronic content can be stored by the first computer system. The first computer system can transmit the first electronic content to the second computer system upon determining that the second computer system is authorized to access the first electronic content.

In some implementations, first electronic content can be stored by a third computer system. The third computer system can transmit the first electronic content to the second computer system upon receiving a second authorization message from the first computer system indicating that the first computer system is authorized to access the first elec-

tronic content. Examples of this configuration are described, for example, with respect to FIGS. **4**A and **4**B.

Example Systems

Some implementations of the subject matter and operations described in this specification can be implemented in digital electronic circuitry, or in computer software, firmware, or hardware, including the structures disclosed in this specification and their structural equivalents, or in combinations of one or more of them. For example, in some implementations, one or more components of the system **100** can be implemented using digital electronic circuitry, or in computer software, firmware, or hardware, or in combinations of one or more of them. In another example, the processes shown in FIG. **8** can be implemented using digital electronic circuitry, or in computer software, firmware, or hardware, or in combinations of one or more of them.

Some implementations described in this specification can be implemented as one or more groups or modules of digital electronic circuitry, computer software, firmware, or hardware, or in combinations of one or more of them. Although different modules can be used, each module need not be distinct, and multiple modules can be implemented on the same digital electronic circuitry, computer software, firmware, or hardware, or combination thereof.

Some implementations described in this specification can be implemented as one or more computer programs, i.e., one or more modules of computer program instructions, encoded on computer storage medium for execution by, or to control the operation of, data processing apparatus. A computer storage medium can be, or can be included in, a computer-readable storage device, a computer-readable storage substrate, a random or serial access memory array or device, or a combination of one or more of them. Moreover, while a computer storage medium is not a propagated signal, a computer storage medium can be a source or destination of computer program instructions encoded in an artificially generated propagated signal. The computer storage medium can also be, or be included in, one or more separate physical components or media (e.g., multiple CDs, disks, or other storage devices).

The term "data processing apparatus" encompasses all kinds of apparatus, devices, and machines for processing data, including by way of example a programmable processor, a computer, a system on a chip, or multiple ones, or combinations, of the foregoing. The apparatus can include special purpose logic circuitry, e.g., an FPGA (field programmable gate array) or an ASIC (application specific integrated circuit). The apparatus can also include, in addition to hardware, code that creates an execution environment for the computer program in question, e.g., code that constitutes processor firmware, a protocol stack, a database management system, an operating system, a cross-platform runtime environment, a virtual machine, or a combination of one or more of them. The apparatus and execution environment can realize various different computing model infrastructures, such as web services, distributed computing and grid computing infrastructures.

A computer program (also known as a program, software, software application, script, or code) can be written in any form of programming language, including compiled or interpreted languages, declarative or procedural languages. A computer program may, but need not, correspond to a file in a file system. A program can be stored in a portion of a file that holds other programs or data (e.g., one or more scripts stored in a markup language document), in a single file dedicated to the program in question, or in multiple coordinated files (e.g., files that store one or more modules, sub programs, or portions of code). A computer program can be deployed to be executed on one computer or on multiple computers that are located at one site or distributed across multiple sites and interconnected by a communication network.

Some of the processes and logic flows described in this specification can be performed by one or more programmable processors executing one or more computer programs to perform actions by operating on input data and generating output. The processes and logic flows can also be performed by, and apparatus can also be implemented as, special purpose logic circuitry, e.g., an FPGA (field programmable gate array) or an ASIC (application specific integrated circuit).

Processors suitable for the execution of a computer program include, by way of example, both general and special purpose microprocessors, and processors of any kind of digital computer. Generally, a processor will receive instructions and data from a read only memory or a random access memory or both. A computer includes a processor for performing actions in accordance with instructions and one or more memory devices for storing instructions and data. A computer may also include, or be operatively coupled to receive data from or transfer data to, or both, one or more mass storage devices for storing data, e.g., magnetic, magneto optical disks, or optical disks. However, a computer need not have such devices. Devices suitable for storing computer program instructions and data include all forms of non-volatile memory, media and memory devices, including by way of example semiconductor memory devices (e.g., EPROM, EEPROM, flash memory devices, and others), magnetic disks (e.g., internal hard disks, removable disks, and others), magneto optical disks, and CD-ROM and DVD-ROM disks. The processor and the memory can be supplemented by, or incorporated in, special purpose logic circuitry.

To provide for interaction with a user, operations can be implemented on a computer having a display device (e.g., a monitor, or another type of display device) for displaying information to the user and a keyboard and a pointing device (e.g., a mouse, a trackball, a tablet, a touch sensitive screen, or another type of pointing device) by which the user can provide input to the computer. Other kinds of devices can be used to provide for interaction with a user as well; for example, feedback provided to the user can be any form of sensory feedback, e.g., visual feedback, auditory feedback, or tactile feedback; and input from the user can be received in any form, including acoustic, speech, or tactile input. In addition, a computer can interact with a user by sending documents to and receiving documents from a device that is used by the user; for example, by sending webpages to a web browser on a user's client device in response to requests received from the web browser.

A computer system may include a single computing device, or multiple computers that operate in proximity or generally remote from each other and typically interact through a communication network. Examples of communication networks include a local area network ("LAN") and a wide area network ("WAN"), an inter-network (e.g., the Internet), a network comprising a satellite link, and peer-to-peer networks (e.g., ad hoc peer-to-peer networks). A relationship of client and server may arise by virtue of computer programs running on the respective computers and having a client-server relationship to each other.

FIG. **9** shows an example computer system **900** that includes a processor **910**, a memory **920**, a storage device **930** and an input/output device **940**. Each of the components **910**, **920**, **930** and **940** can be interconnected, for example, by a system bus **950**. The processor **910** is capable of processing instructions for execution within the system **900**. In some implementations, the processor **910** is a single-threaded processor, a multi-threaded processor, or another type of processor. The processor **910** is capable of processing instructions stored in the memory **920** or on the storage device **930**. The memory **920** and the storage device **930** can store information within the system **900**.

The input/output device **940** provides input/output operations for the system **900**. In some implementations, the input/output device **940** can include one or more of a network interface device, e.g., an Ethernet card, a serial communication device, e.g., an RS-232 port, and/or a wireless interface device, e.g., an 802.11 card, a 3G wireless modem, a 4G wireless modem, a 5G wireless modem, etc. In some implementations, the input/output device can include driver devices configured to receive input data and send output data to other input/output devices, e.g., keyboard, printer and display devices **960**. In some implementations, mobile computing devices, mobile communication devices, and other devices can be used.

While this specification contains many details, these should not be construed as limitations on the scope of what may be claimed, but rather as descriptions of features specific to particular examples. Certain features that are described in this specification in the context of separate implementations can also be combined. Conversely, various features that are described in the context of a single implementation can also be implemented in multiple embodiments separately or in any suitable sub-combination.

A number of embodiments have been described. Nevertheless, various modifications may be made without departing from the spirit and scope of the invention. Accordingly, other embodiments are within the scope of the claims.

What is claimed is:

1. A method for regulating access to electronic content based on content usage telemetry data, comprising:

receiving, by a first computer system from a second computer system, a request for access to first electronic content, the second computer system being associated with an access profile;

determining, by the first computer system based on the access profile, that the second computer system is authorized to access the first electronic content;

transmitting, from the first computer system to the second computer system, a first authorization message indicating that the second computer system is authorized to access the first electronic content;

receiving, by the first computer system from the second computer system, content usage telemetry data,

wherein the content usage telemetry data comprises one or more data items indicating metrics of use of the first electronic content by the second computer system, including a plurality of types of usage of the first electronic content by the second computer system, and

wherein the plurality of types of usage comprise:

a first type of usage comprising adding the first electronic content in a computerized model and simulating an operation of an apparatus using the computerized model, and

a second type of usage other than adding the first electronic content in the computerized model and simulating the operation of the apparatus using the computerized model; and

modifying, by the first computer system, the access profile of the second computer system based on the content usage telemetry data, wherein modifying the access profile of the second computer system comprises:

upon determining that the second computer system performed the first type of usage, reducing a number of licensing units available for use by the second computer system by a first amount, and

upon determining that the second computer system performed the second type of usage, reducing the number of licensing units available for use by the second computer system by a second amount different from the first amount.

2. The method of claim **1**, wherein the first electronic content comprises one or more of a data object for use in the computerized model, an image, a video, audio, or textual data.

3. The method of claim **1**, wherein the content usage telemetry data comprises one or more data items indicating a length of time that the electronic is in use by the second computer system.

4. The method of claim **1**, wherein the content usage telemetry data indicates, for each type of usage of the first electronic content by the second computer system, a length of time that the electronic is in use by the second computer system according to that type of usage.

5. The method of claim **1**, wherein the one or more types of usage comprise one or more of including the first electronic content in second electronic content, presenting the first electronic content to a user, or performing one or more data processing techniques with respect to the first electronic content.

6. The method of claim **5**, wherein presenting the first electronic content the user comprises displaying at least a portion of the first electronic content to the user using a display device.

7. The method of claim **1**, wherein the content usage telemetry data is received periodically by the first computer system from the second computer system.

8. The method of claim **1**, wherein the content usage telemetry data is received continuously by the first computer system from the second computer system.

9. The method of claim **1**, wherein the content usage telemetry data is transmitted by the second computer system to the first computer system in response to a trigger event.

10. The method of claim **9**, wherein the trigger event is an end of a usage session of the first electronic content.

11. The method of claim **1**,

wherein determining that the second computer system is authorized to access the first electronic content comprises determining that the number of licensing units available for use by the second computer system is greater than or equal to at least one of the first amount or the second amount.

12. The method of claim **11**, wherein modifying the access profile of the second computer system based on the content usage telemetry data comprises increasing or decreasing the number of licensing units available for use by the second computer system based on the content usage telemetry data.

13. The method of claim **1**, further comprising determining an amount of funds associated with usage of the first electronic content by the second computer system based on the content usage telemetry data.

14. The method of claim **1**, wherein first electronic content is stored by the first computer system, and wherein the first computer system transmits the first electronic content to the second computer system upon determining that the second computer system is authorized to access the first electronic content.

15. The method of claim **1**, wherein first electronic content is stored by a third computer system, and wherein the third computer system transmits the first electronic content to the second computer system upon receiving a second authorization message from the first computer system indicating that the first computer system is authorized to access the first electronic content.

16. A system comprising:

one or more processors; and

one or more non-transitory computer-readable media including one or more sequences of instructions which, when executed by the one or more processors, causes:

receiving, by a first computer system from a second computer system, a request for access to first electronic content, the second computer system being associated with an access profile;

determining, by the first computer system based on the access profile, that the second computer system is authorized to access the first electronic content;

transmitting, from the first computer system to the second computer system, a first authorization message indicating that the second computer system is authorized to access the first electronic content;

receiving, by the first computer system from the second computer system, content usage telemetry data,

wherein the content usage telemetry data comprises one or more data items indicating metrics of use of the first electronic content by the second computer system, including a plurality of types of usage of the first electronic content by the second computer system, and

wherein the plurality of types of usage comprise:

a first type of usage comprising adding the first electronic content in a computerized model and simulating an operation of an apparatus using the computerized model, and

a second type of usage other than adding the first electronic content in the computerized model and simulating the operation of the apparatus using the computerized model; and

modifying, by the first computer system, the access profile of the second computer system based on the content usage telemetry data, wherein modifying the access profile of the second computer system comprises:

upon determining that the second computer system performed the first type of usage, reducing a number of licensing units available for use by the second computer system by a first amount, and

upon determining that the second computer system performed the upon determining that the second computer system performed the second type of usage, reducing the number of licensing units available for use by the second computer system by a second amount different from the first amount.

17. A non-transitory computer-readable medium including one or more sequences of instructions which, when executed by one or more processors, causes:

receiving, by a first computer system from a second computer system, a request for access to first electronic content, the second computer system being associated with an access profile;

determining, by the first computer system based on the access profile, that the second computer system is authorized to access the first electronic content;

transmitting, from the first computer system to the second computer system, a first authorization message indicating that the second computer system is authorized to access the first electronic content;

receiving, by the first computer system from the second computer system, content usage telemetry data,

wherein the content usage telemetry data comprises one or more data items indicating metrics of use of the first electronic content by the second computer system, including a plurality of types of usage of the first electronic content by the second computer system, and

wherein the plurality of types of usage comprise:

a first type of usage comprising adding the first electronic content in a computerized model and simulating an operation of an apparatus using the computerized model, and

a second type of usage other than adding the first electronic content in the computerized model and simulating the operation of the apparatus using the computerized model; and

modifying, by the first computer system, the access profile of the second computer system based on the content usage telemetry data, wherein modifying the access profile of the second computer system comprises:

upon determining that the second computer system performed the first type of usage, reducing a number of licensing units available for use by the second computer system by a first amount, and

upon determining that the second computer system performed the second type of usage, reducing the number of licensing units available for use by the second computer system by a second amount different from the first amount.

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